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Citrus By-Products

By John H. Irish, Industrial Chemist of the Fruit Products Division of the College of Agriculture University of California, Berkley.

Few citrus growers realize the importance of the proper disposal of the surplus fruit. The term "culls" by which such fruit is generally known is not very elegant and conveys the idea of bad fruit which is often not true. In this class of fruit is included oversized, undersized, malformed, tree scarred or otherwise blemished but sound fruit. The writer prefers to call all fruit which is not packed in the packing house where it is received from the grove, surplus fruit.

This distinction is made because it is the practice in some districts to sell what are called packing house culls which are hauled away sorted and packed similarly to the good grades of fruit and placed on the market in competition with the best fruit.

The main reasons for disposing of the surplus fruit is to get it out of the way and to get the greatest possible returns for it. How can this be done? To the average grower it would seem that the best disposition of the surplus fruit would be to sell it at whatever price could be obtained for it regardless of the use to be made of it subsequently. Many growers are so unfamiliar with the processes of marketing that this attitude is to be expected.

MR. J. H. IRISH

Has been doing a great deal of research work on behalf of the fruit industries of California, especially as relates to fruit juice beverages and fruit preserves made from cull fruit. The results of his work are shown in the present active industrial development of manufacture of by-products from surplus fruits.

Few people realize the importance of keeping the surplus fruit out of competition with the packed fruit.

The following will serve to illustrate this point. About two years ago, twenty-two carloads of packed oranges were on the market in the process of distribution in one of the larger cities of the United States. Some were in warehouses, some in hands of brokers and some on the retail market. These oranges were retailing at $3.75 and $3.25 a box.

Just at this time eleven car-loads of "culls" were shipped into that city and "dumped" on the market at 75c a box, which netted the grower 50c a box. That was fine, 50c a box for "cull" oranges. What happened next? The price of the 22 carloads of packed oranges immediately dropped 50c a box. The first grade dropped to $3.25 and the second to $2.75 a box. Who paid for the "culls". Probably some of those same growers who received 50c a box for their 11 carloads of "culls" lost 50c a box on on 22 carloads of packed oranges. It is quite evident who paid for the culls in this instance.

Too much emphasis cannot be placed on the importance of keeping the surplus fruit out of competition with the packed good grades of fruit.

By-Products

By-products is the solution of this problem. There is an ever increasing demand for by-products of the citrus industry, some of which are easily prepared and can be consumed in large quantities. Others are more difficult to prepare, while for others there is very limited use.

It is my purpose to consider here the products which can be made in any citrus district where sufficient fruit is available without excessive expenditure for equipment.

ORANGE JUICE is one of the most extensively advertised food products on the market today and its

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Citrus Fruits - Cultivation

The Water Requirements of Florida Citrus Trees

By Dr. Arthur S. Rhoads, Associate Plant Pathologist, Cocoa Laboratory of the Florida Agricultural Experiment Station. Address delivered at Farmers' and Fruit Growers' Week at Gainesville, August, 8-13, 1927.

Florida Citrus growers are too strongly inclined to consider that applications of commercial fertilizers constitute the unit by which success in citriculture is to be measured. If good quality fruit is not produced, or if certain diseases, such as dieback and ammoniation, frenching, and other obscure troubles appear in the groves, the fertilizer is often blamed as the cause and a more or less radical change made in the formula or even in the brand.

Citrus fruits are in reality humble, plain, every-day livers. While hundreds of minerals are known to science only a few are demanded. Water, nitrogen, potash and phosphorous are the coffee, meat, potatoes and bread of the plant world. They will produce the rosy-checked, luscious apple, the queenly gold orange, the charming brunette grape and the genuinely blond grapefruit. A little mysteriously concocted, high-priced, ammoniated, double superphosphated fertilizer may serve as a tobasco sauce for some of the high livers among the fruits, but the stock supply of staples found in most soils is sufficient for nearly every plant, tree and flower.

As a matter of fact the necessary plant food is only one of the conditions essential for tree growth and fruit production, which must be balanced with a number of other conditions. Growers too often consider Citrus culture in terms of fertilizer elements. When a man is sick his physician does not cut off a chunk of flesh and analyze it for carbon, hydrogen, oxygen, nitrogen, potash, phosphorus or lime; yet these are all necessary constituents of the human body. Instead he examines his physical condition to determine whether or not pure air is getting into his lungs, whether the food eaten is being assimulated or rendered inoperative because of some condition which interferes with its assimilation, whether or not the food-giving solutions and blood are circulating freely through his system, whether or not the toxins, or excreta, that result from life processes are being constantly removed, whether or not the beneficial bacteria have a chance to do their work, whether or not harmful bacteria are present, and whether or not his vitality or bodily functions are impaired by any abnormal condition. Why should we not treat citrus trees in the same logical way instead of making such radical changes in the fertilizer formula, because they do not grow in ideal fashion?

Dr. Arthur S. Rhoads

Let us then think for a while of the soil as the home in which the tree lives and develops—as a dwelling place that must be kept in a sanitary condition. In addition to fertilizer, there must be ample moisture, but good drainage and aeration, good texture and depth, absence of closely underlying rock or hardpan, ample humus, and the presence of bacteria in order that our soil may be productive. Along with adequate supplies of plant food we must, above all, maintain optimum soil moisture conditions since all plant food taken in by the roots must be dissolved in water. In times of drouth the fertilizer we apply to the soil necessarily remains inactive. Deficiency of soil moisture, moreover, checks tree and fruit growth and, when followed by copious rains, frequently causes much splitting of fruit. It will thus be seen that there are a number of physical and hygienic conditions of the soil that must function harmoniously before we can expect to obtain the best results from the use of fertilizers.

We are rapidly coming to a keener appreciation of the value of natural agencies in crop production and we must learn to make conditions favorable for their functional activity and so direct these natural agencies that they will be of greatest influence for our benefit. In the past we have relied too strongly upon the efficacy of commercial fertilizers without due regard to the other agencies that are operative in tree development. We have practiced constant cultivation without paying sufficient attention to the effect upon our soils or the importance of growing cover crops until we have, in many cases, largely depleted the too often scanty original supply of organic matter in our grove soils. In other words, we have frequently brought about unnatural and unfavorable conditions, which result in the inability of citrus trees to function properly. In consequence of this a number of complex nutritional and other troubles develop and the trees affected become weakened and devitalized.

No matter how good the trees are, how well they have been planted, how good the fertilizer may be, or how lavishly it may be applied, it is impossible to obtain good results if the tree roots encounter unfavorable environmental conditions, such as deficiency of soil moisture, inadequate drainage, excessive leaching, deficiency of the necessary soil bacteria, an excessively acid or alkaline condition, or substrata of rock, hardpan or marl which limit root development and the moisture-holding capacity or drainage of the soil. Thus it is highly important to insure optimum conditions in the soil, which is the foundation of the grove, in order that defective soil and soil moisture conditions may not prove limiting factors in Citrus fruit production.

In the wild state the edible species of Citrus are usually found growing

in partial shade in hot, humid climates, on soils rich in organic matter and abundantly supplied with water from the heavy rainfall of those countries. In Florida, the early groves were planted where the sour orange grew naturally in the low hammocks. Of late years, however, as a result of commercial stimulation and developments, we have planted citrus trees on about every type of soil that occurs within the citrus section of the state. Many of these groves or parts of groves today are on land utterly unfitted to citrus culture, or at least on land where the trees will be short-lived, inclined to develop a great variety of troubles and prove to be more of a liability than an asset. Many of these groves are on land that is inadequately drained, especially when prolonged rainy periods occur. Others are on land that is lacking in moisture-holding capacity, fertility or humus. Others suffer from restricted root development as a result of underlying rock. Still others suffer from decided fluctuations of the water table, becoming too wet during the rainy season and too dry during the dry season of the year. However, enough for the general situation.

Let us first consider briefly the vital processes of the plant body. Those that are necessary to life are respiration, nutrition, absorption, transpiration and growth. The plant breathes, that is, it uses oxygen and produces carbon dioxide as a by-product, as man and other animals do. It absorbs raw food materials from air in the form of gases and from the soil in the form of dissolved matter in the soil solution, and manufactures them into food materials for the repair of old parts and the development of new parts, this building up process being termed growth. The plant evaporates the surplus water it does not need by the process called transpiration. These are in brief the living processes of the plant and it is the failure or disturbance of one or more of these vital processes that produces the abnormal state of the plant called disease.

Citrus trees, like most plants, get thirsty and are hard drinkers. From 60 to 90 per cent of the weight of a plant is formed from water and from 200 to 500 pounds of water are transpired for each pound of dry plant material produced. A six foot sunflower will evaporate a quart of water in one warm day. A large citrus tree will probably transpire, or give off into the air, as much as 5,000 gallons of water a month in warm weather.

The feeding zone of the roots in the soil is the dining-room of the citrus tree and it may be large or restricted depending upon the soil and soil moisture conditions. Numerous observations have shown that the feeding roots of citrus trees do not, as a rule, extend much beyond a depth of 3½ feet, even on the deeper, sandy soils. On low-lying, heavy soils they may be confined largely to the first foot or two. The tap-roots, of course, go deeper if conditions are favorable to their development. No appreciable amount of feeding roots reach below the fourth foot and most of them lie from within a few inches of the surface to a depth of from 18 to 24 inches.

The root systems of citrus trees are very adaptable in their development and are greatly influenced by the soil and soil moisture conditions in which they develop. The tap root may vary from one of great depth and branching in well-drained soils to one of very scanty and abbreviated development, in which it ends suddenly in a series of rapidly tapering divisions. The latter mode of development is the rule in trees growing on low, wet land, especially when closely underlaid by marl, clay, hardpan or other impervious layer. As a result of the prolonged saturated condition of the soil, the taproot is necessarily greatly restricted in its development and entirely curtailed when the saturated soil is reached. In soils with a more or less fluctuating water table the divisions of the taproot may elongate during dry periods, but are sure to be killed back when the level of the water table rises during the next wet period. New roots will then develop from the callus formed at the margin of the living tissue as soon as the soil becomes sufficiently dry to permit their development. The taproots of citrus trees in the low, poorly drained situations may thus alternately be killed back and develop new roots repeatedly.

In more severe cases of injury to the root system by excessive water, not only the majority of the taproot, but also many of the deeper-lying lateral roots may be killed off by a sudden rise in the water table. New roots may develop subsequently from the callus formed at the margins of the living areas, if the root systems have not been injured so severely that the trees die outright. Instances are sometimes found where two or three different root systems have been developed successfully on water-injured trees, each one nearer the surface than the preceding system, the lower roots having been killed. Hundreds of citrus trees are removed annually in Florida on account of dead or rotted roots, as a result of water injury, when they should be in their prime.

Trees grown in low hammock soils closely underlaid by marl, not only have very poorly developed taproots, but have all their lateral roots confined to the first foot of soil. As a result of this superficial root distribution they are very easily overturned by storms. Nursery stock grown in such soils is characterized by greatly abbreviated taproot development and scanty development of feeding roots on the superficial lateral roots and presents quite a contrast to trees grown in deep, well drained, sandy soils, which have a good taproot development and an abundance of fibrous, feeding roots. For this reason it is not advisable to set out on high, well-drained land, nursery stock grown on low hammock soils, unless special attention can be given to watering the trees.

It is just as necessary that air should penetrate and circulate thru the soil as it is that it should circulate thru rooms of our homes and enter our lungs. In order for most plants to function and develop properly, there must be a supply and interchange of air in the soil, from which oxygen may be obtained by the roots, and citrus trees are no exception. In the process of respiration, which is as necessary in plants as it is in animals, the roots, as well as other parts of the plant, take in oxygen and give off carbon dioxide. The carbon dioxide respired from the roots and that in the soil unites with the water, forming carbonic acid, which assists in the solution of mineral matter not soluble in water alone. The delicate, feeding rootlets must be able to penetrate the soil freely to reach the films of moisture, which cling to the soil particles, and absorb through their cell walls the plant food that has gone into solution and pump it into the plant circulation. A soil, therefore, will not make a good environment for root growth when the air supply in the pore space, or space between the individual soil particles, is driven out by saturation or waterlogging.

The type and condition of the soil have much to do with the amount of air available. In loose, sandy soils the total amount of air space may be comparatively large, while in compact, clayey soils the total amount of air space may be very small. In an experiment by Hutchins and Livingston with a certain clay loam soil, it was found that the oxygen-supplying power of the soil was 1,000 to 1,300

cubic millimeters per hour when moistened as for good growth of plants, but was reduced to 590, or one-half as much, when quite wet, and was only 20, or about one-sixtieth as much, when wet and packed. Heavy soils also have a relatively high capacity for moisture and are relatively slow in drying out after they have once become saturated.

Aeration is an important factor in many forms of citrus root diseases. When soils are wet for prolonged periods the water completely fills the air spaces, crowds out most of the air and prevents other air from entering. Such soils are said to be waterlogged. Not only do the roots of citrus trees cease to function in waterlogged soils but, in many cases, they actually die in consequence of waterlogging, and then rot, or at least become weakened to such an extent that they are readily attacked by various root-disease organisms. Many parasitic organisms probably require less oxygen than the roots they attack and can grow well in saturated soils that would injure the roots. Some species or varieties of citrus rootstocks, such as sour orange, are capable of resisting a temporary excess of water better than others, but all citrus roots will be injured by prolonged exposure to conditions of excessive soil moisture.

However, even if citrus roots do not actually die and rot, they cease to function in soil saturated with water and are, so to speak out of commission until the soil dries out sufficiently for some aeration to occur. When the roots become inactive, the trees also stand still and fail to grow and produce as they should. It has even been shown by experimental work that the breathing pores of various plants tested, close when root activity ceases on account of waterlogging of the soil.

Good aeration of the soil essential, not only for the proper functioning of citrus tree roots, but also for the proper functioning of the valuable soil microorganisms. Many people think that the soil is a dead and inert mass, but such is not the case for we know that every soil is the home of millions of microorganisms. The nitrifying group of bacteria change the ammonia into nitrites, and these into nitrates, which can be absorbed and utilized by plants. These minute bacteria transform humus into plant food. Another group of these bacteria have the power to cooperate with leguminous plants in changing, or "fixing", the inert nitrogen of the air into nitrates so costly and necessary to plant production. In waterlogged soils the work of this group of bacteria may be checked, even to the extent of denitrification.

There is also a possibility of the other extreme in aeration, for example, excessive aeration in the case of loose types of soils. The air content may actually become excessive, so that, under certain conditions, such rapid changes may take place as to lead to malnutrition, too rapid oxidation, or burning up, of organic matter, etc., when sandy soils in warm climates are stirred too much during dry seasons of the year. Aeration in heavy soils may be obtained by drainage, proper irrigation, plowing or otherwise cultivating the soil, and the incorporation of bulky organic matter. Excessive aeration of light, sandy soils may be partially prevented, when necessary on types that are too loose, by less frequent or more shallow cultivation.

Another point in the relation of water to citrus trees is that in wet seasons, where the subsoils are open or porous, nitrates and other soluble salts may be leached or carried below the root zone of the trees. They are thus practically wasted since the upward movement of soil moisture, even from a free water surface, may be too slow to be of any material benefit to citrus trees.

Another important relation of water to citrus trees is the connection with the splitting and the internal drying out of fruit. That water may be withdrawn from fruits by the leaves has been known for at least 200 years. In spite of the fact that in recent years several investigators have called attention to this phenomenon its importance does not appear to be fully recognized. A striking demonstration of the way in which fruits may serve as water reservoirs for the leaves when the supply from the roots is limited may be made by cutting off two orange or grapefruit branch ends, each with a single, well-developed fruit. On one branch end the fruit should be cut off and all cut ends of the twigs sealed with hot paraffin. The differences in the rates of water loss can be observed by keeping the specimens indoors for from one to a few days. The leaves or the branch on which the fruit was cut off will be found to have wilted and dried up within 24 hours, while the detached fruit will be found to retain its firmness for several days. On the other hand, the leaves of the branch on which the fruit has been left will be found to be fairly free from wilting at the end of 24 hours, but after the lapse of several days, the fruit will be found to have become quite soft. A similar comparison can be made in the case of a tree suddenly defoliated and dying from an abrupt rise of the water table. The fruits that adhere to such a tree dry out much more rapidly than those which fall to the ground.

In a study of the internal drying out of lemons in California, Bartholomew has shown that a lemon may lose as much as 6 per cent or more of its water between 6 A. M. and 5 P. M. of the same day, due principally to withdrawal by the leaves. He has also shown that a lemon may fail to regain at night an amount of water equal to that withdrawn during the day, and that by the end of 2 weeks it may have suffered an actual loss of at least 9 per cent of its water content. That such a depletion of water must have a profound effect upon the size, texture, flavor, etc. of the fruit can hardly be questioned. It is quite obvious, as shown by Bartholomew, that, aside from its age, content of solids, etc., the magnitude of the loss or gain in water content during the day is governed largely by such factors as physical vigor of the tree, soil moisture, temperature (air and soil), relative humidity, wind velocity, and sunshine.

Recent studies have shown that a number of our citrus troubles, such as spring dropping of fruit, splitting of immature fruit, dropping and internal drying of ripe fruit, and much chronic wilting and dying of trees are but different phases of the so-called "water relations" problem. The citrus tree has certain water requirements for its normal development and these are affected by both the amount of available soil moisture in relation to the soil type and by the conditions influencing the rate of evaporation from the leaves. Our combination of irregular rainfall, soils of a relatively low water-holding capacity and content of organic matter and extremes of humidity bring about periods of stress for the trees, which contribute to the development of the above-named troubles. The occurrence of such troubles can be reduced to a minimum by the practice of irrigation and such cultural methods as will insure optimum conditions for soil moisture, aeration, bacterial activity and the availability of food materials.

The sandy soils of Florida, which are deficient in organic matter, are peculiar in that, when they once become dry, they repel water and are very difficult to wet up again. They are further characterized by the fact that there is but little lateral movement of the water in the soil, the rainfall tending to seep down in places where the soil is loose or

where organic matter is present, with the result that intervening areas tend to remain dry. Even after prolonged periods of rainfall local areas of the subsoil about the roots of trees often remain as loose, dry, running sand.

During the late fall, winter and early spring months, which is the dry season of the year, it is a very common matter to see citrus trees of all ages, from replants to old bearing trees, wilting, dropping their leaves and dying from lack of moisture in the soil. In fact many groves often suffer from lack of moisture for weeks, or even months, at a time. That there is a pronounced lack of moisture in many of our grove soils is also clearly evident from the wilting of the weeds often allowed to grow in competition with the citrus trees.

Considering the moisture equivalent values and the limited capillary action in a number of our sandy soils, the great range of local variation in soil moisture conditions and the difficulty in moistening the lighter sandy soils after they have once dried out, the extremes of fluctuation in the water table in many situations, the rock pockets often occurring under trees, in which the roots can be injured as a result of the soil becoming either too dry or too wet, and the frequent occurrence of droughty periods after injury to the root systems of trees in local situations by excessive water, it is not at all surprising that trees should frequently develop a chronic wilt and decline which is often difficult to account for without an intimate knowledge of the local soil and soil moisture conditions.

For a proper understanding of the soil moisture problems, it is necessary to have a clear conception of those principles of soil moisture distribution which are active when a soil is wetted either by natural rainfall or by artificial means. The amount of water a soil can hold against the downward pull of gravity varies with the fineness of the individual particles that go to make up the soil mass. Soils in which the individual particles are relatively large or coarse are remarkably low in their water-holding capacities. The more finely divided the individual particles are the greater will be the water-holding capacity of the soil. For example, a fine sand will retain moisture better than a sand, a loamy soil better than a sandy soil and a clayey soil the best of all. It is for this reason that soils with a clayey subsoil, hardpan or other impervious layer are less subject to leaching and lend themselves so admirably to subirrigation.

The fundamentals of grove soil management are to maintain at all times a supply of available plant food within reach of the roots and to properly control the soil moisture. Cultivation may be an aid or a detriment in maintaining fertility and proper moisture relations, according to the practices used.

It may be well to consider briefly the functions of cultivation, or, in other words, why groves are cultivated. Contrary to the general belief cultivation, in itself, is of little service in preventing the loss of soil moisture by evaporation. It does, however, prevent losses of water indirectly by checking the growth of weeds. It may also put the ground in better condition for holding subsequent rainfall by retarding runoff. This is especially applicable on slopes where the land should be cultivated so as to leave furrows along the contour lines to retard the quick run-off of dashing rains. The four main objects of cultivation are: (1) the preparation of a seed-beed; (2) to put the soil in condition to absorb water well; (3) to conserve moisture by eliminating weed competition; and (4) to incorporate fertilizer materials and cover crops with the soil. In the case of heavy soils, however, there is a fifth function of cultivation to be considered, which is the stimulation of nitrification. It has been shown in California that, while cultivation had no effect upon nitrification in certain sandy loams, nitrification was increased by cultivating some clay soils.

It was previously maintained that cultivation was necessary to conserve moisture by stirring the surface soil to make a dust mulch and thereby break up capillary action. While there is abundant evidence that under humid climatic conditions a large portion of the water from rains which fall on the soil is lost by evaporation, many writers of textbooks and treatises on soils in the past have laid undue stress on the losses of moisture thru evaporation from the soil surface by upward capillary movement. It was generally held that losses of water are occasioned by the upward movement of moisture from the lower moist layers of soil, this belief being based on the familiar teaching that moisture is capable of moving in all directions thru capillary forces. The part cultivation is supposed to play in preventing the upward rise and consequent loss of moisture into the atmosphere is based upon the theory that, by loosening the surface, rapid drying takes place and the soil particles are removed from close contact with one another. The first condition is believed to shut off evaporation because the dry soil is assumed to act as a blanket or dust mulch; the second, by reducing the points of contact, is believed to lessen the capillary pulling power. While a great many references may be cited in support of this basic idea, almost as many may be cited in refutation of it.

Within the past few years considerable light has been thrown on the subject of the extent to which cultivation conserves soil moisture. Recent experimental work indicates that the movement of moisture, especially in an upword direction, from moist soils to drier soils is slight in amount and extent within periods of time with which orchardists are concerned, particularly when the source of the moisture supply is not saturated soil in contact with a free water surface. Recent experimental work also shows that the amount of water taken from the soil by plant transpiration is tremendously greater than that evaporated directly from the surface of the soil. Records obtained by Prof. Viehmeyer, of the University of California, from tanks in which trees were growing, and which were covered so that the losses of moisture were confined almost entirely to transpiration losses, afford an excellent opportunity to compare transpiration with evaporation. In 1921, a 3-year-old prune tree in a tank used 585 pounds of water between May 21 and November 21, a period of 6 months, while a similar tank containing the same kind of soil, but neither cropped nor cultivated, lost only 28 pounds within the same time. This same tree, from Mar. 1, 1922 to November 4, 1922, used 1,250 pounds of water, while the uncropped tank again lost only 28 pounds between this date and November 4.

It is now pretty well established that cultivation does not save appreciable amounts of moisture except to the extent to which it kills weeds which would rapidly withdraw moisture from the soil. At any rate, moisture losses by evaporation from grove soils are confined to the upper few inches whether the soils are cultivated or not, while moisture losses thru use by trees extend to a depth of several feet. It has been shown from experimental plot work in California that the rate of loss of moisture from the root zone of full grown citrus trees is not appreciably influenced by cultivation, and where there has been any appreciable difference it has apparently been in favor

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Spraying & dusting, Citrus Fruit

Dusting of Citrus Trees

Max Waldron Horticulturist, Cirtus Grove Development Company, Babson Park, Florida, at Meeting of State Horticultural Society.

No citrus grove operation of importance has been more rapidly and generally adopted than has the dusting of trees for the control of rust mites. Until four years ago the standard method of accomplishing that work was by spraying with lime sulphur solution throughout the year, which entailed great expense and delay and also destroyed much fruit by burning.

Today the majority of growers, in Polk County at least, rely for rust mite control, upon the power duster using finely ground sulphur. Without this method the grove caretakers would have been unable to profitably cope with ubiquitous rust mite on the large acreage which has recently come into bearing. With all other grove care costs rising as they did during the recent years of Florida's rapid expansion, it is fortunate that in one field at least the cost of care has been reduced and with no unsatisfactory results.

Our conclusions resulting from the methods and results herein discussed are gained from very extensive dusting operations conducted for the past four years on fifteen hundred acres of groves at Babson Park in the Ridge section. We enjoy no immunity from rust mites such as some of our East Coast friends claim for themselves.

In working out on these groves what we consider the most satisfactory method of rust mite control, we have become a staunch supporter of dusting but at the same time refuse to abandon the practice of applying one spraying of lime sulphur shortly after the petals have fallen.

Another advantage of using the lime sulphur spray in addition to controlling mites and scale crawlers is that nicotine sulphate can be added and this will get the aphids, at a less cost, than the dusting. These advantages, coupled with the fact that lime sulphur used in April controls the rust mite until at least the middle of June, and with no burning effect whatever, makes us believe it is too valuable a spray to be discarded. After applying that, however, we are successful in further controlling the rust mites with rarely more than two dustings.

We believe our greatest success is due to the fact that we put the duster in the grove before the rust mites become numerous enough to find without considerable searching.

If the mites are abundant enough to be detected without the use of a glass, it is usually too late to secure good control.

One reason for insisting upon this April lime-sulphur spray is largely because of the additional control of red spiders and scale crawlers which the dust fails to give. There is scarcely any spectacle worse to view than a grapefruit grove in April, suffering from a bad attack of six spotted mites.

In this connection we wish to call your attention to the great disparity of opinion regarding the value of lime-sulphur in controlling scab. According to Winston under laboratory conditions it gives 50% protection, due to its mildly fungicidal properties. We believe, however, that in a commercial way at least, there is little if any scab control to be had from an application of lime-sulphur for the reason that the effects are not lasting. Outbreaks of scab have always been light in our groves which in the past made us feel our annual lime sulphur spray had done some good in that respect. On the other hand an occasional rankly growing grove will show heavy infestation despite the protection of lime-sulphur. We believe more educational work should be done in this particular field, with the idea of clearing up the minds of many growers. Many insecticide salesmen lead the growers to believe that lime-sulphur is a real preventive of scab and thus much inferior fruit results.

As a basis in securing figures representing the cost of sulphur dusting, I have selected one grove, consisting of ten acres of grapefruit, fourteen years old, which is typical in every respect and represents the average grove of that age in our territory. This grove is located one mile from water and has always been expensive to spray for that reason. The cost of rust mite control in this grove during the year 1926, was as follows:

April 22, Lime sulphur spray	$92.84
June 23, Sulphur dusting	22.65
Aug. 10, Sulphur dusting	22.50
Total	$140.99

The total cost of dusting was $45.15. An average of slightly less than one pound of dust per tree was applied each time, with a standard power duster type of dust used was a 95-5, i e.: 95% of sulphur and 5% of lime. The dusting was always done in the day time.

The first picking in this grove consisted of 800 boxes which graded 308 Brights, 327 Golden, no russets, and 167 choice, due to thorn scratches. The fact that there were no russets at all demonstrated the effectiveness of dusting because the first dusting was done in June which is the banner rust mite month.

The total cost of rust mite control in this grove figured 3½c per box, or 26c per tree. The total cost would have been over twice as much had we depended entirely on a lime-sulphur spray, provided our experience in previous years repeated itself.

This system of an April lime-sulphur spray, followed by two well timed dustings, has for three years, given us practically complete control of mites. In fact one grove thus treated furnished us with fruit which won the blue ribbon in the Polk County exhibit at the South Flordia Fair in Tampa this year. In looking over the results of the first pool of grapefruit, I find nearly 99% of our fruit graded Brights and Goldens.

In the matter of dusting for scab and melanose, with copper-lime dust, we confess we are still in the skeptic class. This dust no doubt is effective against diseases on pubescent leaves such as cucumbers, squash, etc., but it fails to adhere well to the extremely smooth and glossy grapefruit leaves. The chief objection to the use of it, however, is that even in certain cases where it does adhere there is not enough copper deposited to materially prevent the growth of fungi. In other words it is not possible to apply the dust thick enough to cover the leaves thoroughly. It is estimated that it would require four successive dustings to get as much copper on the trees as would be done by one spraying. The greater success by the vegetable growers in the use of copper-lime dust is accounted for by the fact that they make repeated applications and also because the object they are dusting is so small it gets the full force of dust from the machine. This is manifestly impossible with large citrus trees.

Our own experience with the copper-lime dust has been admittedly slight, but upon inquiry among those who have used it we fail to find any enthusiastic response. When some

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The Effect of Arsenic on the Composition of Citrus Fruits

By W. W. Yothers (1)

For many years it has been known to at least a few Florida Citrus growers that sprays containing arsenic would 'sweeten" fruit by largely eliminating the acid content. It is not known to us who was the first grower to discover this phenomenon. While there may have been several growers before 1894 who knew of the effect of arsenicals, we only have definite information about one.

Some time before 1894, Mr. F. G. Sampson, Boardman, Florida, used Thrip juice to kill scale insects. Again between 1904 and 1910 Mr. J. A. Farnbach used the same spray for scale insects in Mr. Sampson's grove. An analysis of this spray, made several years later, showed that it contained 2.2% arsenic as metalic arsenic. While there is no proof that the material used in 1894 and in 1904 to 1910 was of the same composition, we surmise that it was identical. According to Mr. Farnbach's observation, the application of this spray rendered the fruit insipid and he claimed that arsenic was the cause of the great change in the fruit. The laborers nearly ate up the crop before the fruit had colored. Mr. Farnbach's statement is verified by another man who has been on the grove throughout the past 35 years.

I remember very distinctly a conversation with the late Mrs. Okle Painter Williams, who was President at that time of the E. O. Painter Fertilizer Company. She complained that their material, Sulpho Citrol, had had one serious objection in that it caused the fruit to become insipid. I told her that in my opinion, it was so difficult to get Florida Citrus growers to spray for bright fruit, that I thought that the less that was said about the objection, the better. The main thing after all was to get the Citrus growers to apply the spray so as to produce a better grade of fruit. She was so honorable in her business ideas that I have always doubted very much if she appreciated my lower standards. Unfortunately for all of us, I have no analysis of this material at that time, so really it is not known if arsenic was present or not. While some other chemical may have caused the fruit to become insipid it was attributed to arsenic.

The most extensive work on the effect of arsenical spray on Citrus fruit has been done in California and was published in the California Monthly Bulletin. Dr. C. F. Juritz, also, published a short article on the researches on the effect of arsenical sprays in the Journal of the Department of Agriculture, Union of South Africa in 1925. In other institutions there is also a great deal of data, on file, which for reasons unknown to me has remained unpublished.

It has been thought advisable to give out the results and observations which have been obtained by the workers of this laboratory.

One large grove of seedling oranges which came under observation was sprayed with arsenate of lead early in June of the past year. Samplings of the fruit from these trees was made on October 4, and again on November 10, with following analyses.

TABLE I

The Effect of Arsenate of Lead on Total Soluble Solids and Ratio of Acid to Solids in Oranges

Description of Sample	Date of Analysis	Brix	% Acid	Ratio
Composite from several trees	Oct. 4	8.90	.50	1 : 15
Do.	Do.	8.40	.73	1 : 11.5
Tree A, fruit from lower limbs	Nov. 10	9.30	.72	1 : 12.91
Tree A, fruit from top of tree	Do.	9.50	1.33	1 : 7.14
Tree B, fruit from lower limbs	Do.	8.55	.85	1 : 10.05
Tree B, fruit from top of tree	Do.	9.25	1.06	1 : 8.72
Tree C, fruit from lower limbs	Do.	9.00	.53	1 : 17.00
Tree C, fruit from top of tree	Do.	9.75	1.26	1 : 7.74
Tree D, fruit from lower limbs	Do.	8.85	.48	1 : 18.44
Tree D, fruit from top of tree	Do.	9.10	1.20	1 : 7.60
Tree E, fruit from lower limbs	Do.	9.05	.37	1 : 24.46
Composite from lower limbs, several trees	Do.	9.80	.82	1 : 11.95

These analyses show that the fruit at the time of each analyses were lacking in normal acidity and total soluble solids which accords with results obtained in California and in Africa where experimental work on this problem has been conducted. They furthermore show in a striking way that the fruits from the lower limbs are much less acid than those from the tops. In fact the fruit from the tops, when judged by these analyses are normal in every way. This observation is entirely at variance with the results of investigations in other Citrus growing sections. The only reasonable explanation that can be offered at this time is that the fruit in the tops was not actually hit by the arsenate of lead spray and therefore was not influenced as the result of the spraying. Curiously others have reported that the application of arsenicals to one portion of the tree influences the fruit on the entire tree.

In another seedling grove the arsenical was applied with a proprietary sulphur dust which was used for the control of rust mites. This dust contained 90% sulphur and the remaining 10% was constituted of lime and arsenate of lead. The percentage of each of these is not known. These dustings were made throughout the season. Two samples of fruit were collected for analyses, the first on November 3, 1926, and the second on January 5, 1927, with the following results:

TABLE II

Effect on Oranges of Arsenical Applied as a Dust

Description of Sample	Date	Brix	% Acid	Ratio
Composite from several trees	Nov 3	9.70	.14	1 : 69.30
Composite from trees not dusted	Do.	9.80	1.11	1 : 8.38
Composite from several trees	Jan. 5	12.30	.17	1 : 72.34
Do.	Do.	11.70	.15	1 : 78.00
Do.	Do.	12.00	.20	1 : 60.00

Continued on page 14

(1) The data given in this paper were assembled at the United States Department of Agriculture Laboratory, Orlando, Florida, Dr. F. A. Wolf, and W. J. Bach, Fruit Disease Investigation, and O. C. McBride, Bureau of Entomology collaborating.

The Citrus Industry

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GROVE CALENDAR FOR NOVEMBER

Timely Suggestions for Grove Work During the Present Month

Put out fall fertilizer on bearing trees; this should contain less nitrogen and more potash than in the spring.

Disc middles of bearing groves.

Bank young trees with lean earth (rotten wood may have wood lice).

If clean-up spray or fumigation for white-fly and scale has been neglected, apply it now.

Do not buy nursery trees that have not been inspected and certified by the State Plant Board. See that trees are completely defoliated, thoroughly scrubbed or fumigated and have certificate tags attached.

Do not buy stunted or scrubby nursery stock.

WHAT'S IN A NAME?

Charging that the Florida Commissioner of Agriculture and the Chief Inspector of his department are nursing political aspirations which tend to lessen and retard their efficiency in office, to the detriment of the citrus industry of the state, Major F. L. D. Carr, representative in the Florida legislature from Hillsborough County, avers that what the industry needs is the formation of a separate bureau headed by a citrus commissioner. Such a bureau, Major Carr believes, would take the citrus industry of the state out of politics and cure most, if not all, of the ills from which the industry now suffers.

Admitting that Major Carr's charges that the Commissioner of Agriculture and his chief inspector have been bitten by the political bug, we fail to see just how we might expect the head of a citrus bureau to be less susceptible to political aspirations than a commissioner or an inspector. As we understand Major Carr's suggestion, the bureau would occupy essentially the same relation to the citrus industry that the department of agriculture does now. Does the Major assume that the changing of the title of the executive head of the bureau would render him immune from political favor? As well might it be contended that merely calling an alderman a commissioner or a mayor a city manager would change their personal characteristics and entirely revolutionize the system of government without even going to the formalty of invoking a new charter.

We much fear that Major Carr's panacea will have to go to the scrap heap along with several thousand other panaceas which during the past dozen or more years have been proposed as infallible cure-alls for the ills of Florida citrus growers. As we understand it, bureau government, whether in national, state or city government, is on the wane. In Florida the demand is for less, rather than for more, bureau government, and for fewer, rather than more bureaus.

THE CLEARING HOUSE PLAN

The Citrus Industry regrets exceedingly that there seems to be a lessening of interest, or at least a slackening of activity, in the proposed citrus clearing house plan.

The Citrus Industry regrets this particularly because it believes that the clearing house plan as outlined by Secretary Jardine and formulated by Mr. Tenney with the approval of Florida distributing agencies, promised more in the way of bettering citrus conditions and distributing problems than any other plan which has been advanced. Indeed, The Citrus Industry believes that every benefit which might be hoped to accrue from any other proposal yet made, could be better attained through the clearing house plan, properly organized and properly supported.

That obstacles have been permitted to retard the organization of the clearing house is to be regretted. It is true that a short crop of citrus in Florida, California and Texas this year, coupled with a shortage in the apple crop which directly competes with citrus, may enable Florida growers to market this season's crop at a profit. Even so, an effective clearing house would have greatly facilitated the orderly movement of the crop this year. With a normal or better than normal crop next year, growers will see the need of a better organized marketing system and a better control of distribution to insure an adequate return on their labor and investment. This the proposed clearing house

would afford as no other proposed remedy could hope to do.

It is for these reasons, and for the added reason that failure to organize the clearing house opens the way for all manner of impractical suggestions, coming mostly from outside of citrus circles, which tend to muddy the waters without even holding out a ray of hope for the practical solution of Florida's citrus marketing problems. Therefore, The Citrus Industry sincerely hopes that the Fruitmen's Club and the committee in charge of the clearing house plan, may resurrect the plan if it has been permitted to expire, or to administer a reviving stimulant if it still lives. This matter is of too great importance to the Florida growers and shippers of citrus fruits to be permitted to go by the board or even to be long postponed.

GROWERS AND SHIPPERS LEAUGE

Issuing a statement at the opening of the winter shipping season, Mr. J. Curtis Robinson, secretary of the Growers and Shippers League says:

"It is very important at the beginning of our new season that members bear in mind the necessity for paying dues promptly between the 1st and 15th of each month on cars shipped during the preceding month. This is very necessary at this period of the year on account of practically no shipping being done during the summer months, our treasurer's balance has run very low and we have current obligations to meet."

The Growers and Shippers League is one of the most important organizations in the state, as well as one of the most effective in its operation. For citrus growers it is the one outstanding organization in the handling of traffic and other important problems which no one shipper or shipping organization is in position to handle alone. The Growers and Shippers League certainly is worthy of the comparatively small dues assessed, and these should be paid promptly to insure the continued effective work of the organization.

GOVERNMENT READY TO AID

That the Federal government stands ready to aid Florida citrus growers in every way possible, is the statement made by Secretary of Agriculture Jardine, as quoted in the United States Daily of November 4.

Discussing a statement by Senator Fletcher which appeared in the same paper on November 2, Secretary Jardine is quoted as saying:

"The real measure of the aid we can lend to Florida citrus growers, is the condition they are in. We will help the industry as much as they they are in position to be helped."

Evidently Secretary Jardine intends to imply that the government stands ready to aid Florida citrus growers, but that first Florida citrus growers must show their willingness to accept such aid. Adoption of the clearing house plan recently suggested would be one of the very best evidences of a desire for government aid which Florida growers could possibly give.

MEXICAN FRUIT FLY

Evidence is not wanting that Texas citrus growers are determined to take drastic action if need be to protect their groves from injury by the Mexican fruit fly which has been discovered in groves in some of the Lower Rio Grande Valley citrus sections.

Texas growers hope by means of some form of certification to be able to ship fruit from the Valley without the necessity of establishing a federal quarantine against the state. A recent conference in Washington disclosed that Texas growers realized the seriousness of the situation and that they are ready to co-operate fully with federal authorities in stamping out the pest which now threatens the groves in this fast developing citrus section.

With a range of more than $6.00 per box between the high and low sales of grapefruit on the New York market one day last week, it requires no great amount of discernment to figure the profits on "fancy" grades as compared to the ordinary or low grade fruits. A difference of $6.00 per box would pay for a lot of fertilizer and insecticide—the two elements most needed for the production of fruit of high quality and fine appearance.

If shipments are properly regulated and distribution properly controlled, the matter of price will largely adjust inself through the law of supply and demand, which in the final analysis is about the most effective adjustor known.

Fruit of quality cannot be produced without the judicious use of plant food in the form of fertilizer. Fruit of fine appearance cannot be produced without the use of sprays, dusts or fumigation.

Spray, dust, fumigate. As an individual grower, you may have your individual choice of insecticides—but, having made your choice, the essential thing to do is to apply that choice with thoroughness and efficiency.

In recent years no citrus grower has made money by the production of inferior fruit—and mighty few growers have lost money who produced fancy fruit.

Most growers know how to rid their groves of rust mites—but a lot of growers fail to put their knowledge to practical use.

Barring mistakes in marketing, Florida growers should continue to receive good prices for their fruit throughout the season.

The Florida College of Agriculture is doing a great work for Florida agriculture.

Grove heaters are expensive, but not nearly as expensive as a frozen grove.

When in doubt, ask your county agent—he knows.

THE EFFECT OF ARSENIC ON THE COMPOSITION OF CITRUS FRUITS

Continued from page 11

It might be said in explanation of the results in this table that these dusted fruits were very insipid to the taste. Moreover they were inferior in size since it was difficult to find sizes larger than 250's. The profound effect of the arsenate of lead, applied as a dust, upon the acidity and soluble solids is again strikingly manifest. The actual amount of arsenic necessary to produce this change in the composition of the fruit must be very small since in all probability a total of less than three pounds of the sulphur compound was applied to each tree, less than 10% of which of course was arsenate of lead. The fact that the ratio of solids to acids in these fruits which were dusted three times is greater than in those sprayed once, as was indicated in Table 1 may be interpreted to show that young oranges are subject to this influence by arsenicals over a considerable period during their early growth. Analyses were also made of fruit taken from another seedling grove in which a proprietory lime sulphur solution was used, which contained, .25 per cent of arsenic. Fruit for analyses were collected on November 3rd, 1926 and again on January 5, 1927 with the following results:

TABLE III

Results of Analysis of Seedling Oranges Sprayed with a Lime Sulphur Solution Containing Arsenic

Description of Sample	Date	Brix	% Acid	Ratio
Composite sprayed at blossoming time	Nov. 3	10.10	.48	1 : 21.00
Composite, sprayed ten days later	Nov. 3	8.68	.61	1 : 14.23
Do.	Jan. 5	10.70	.44	1 : 24.32
Do.	Jan. 5	10.70	.46	1 : 23.26

It appears from these analyses that a single application of arsenical spray made either while the trees were in blossom or just at the close of the blossoming period is practically equally effective in reducing the acid and soluble solids content of the fruit at the time of maturity. If the fruit had been normal when these analyses were made the ratio betwen these constituents would have been approximately 1 : 8.

When an examination is made of the data, as a whole, from all of the tables, it is evident that the same effect follows the application of arsenicals in combination with lime, with sulphur, or with both of these elements together. Further the data show that arsenicals are effective in reducing acidity or soluble solid whether they be applied as sprays or as dusts.

Some growers have entertained the belief that if the fruit which has been rendered insipid by arsenicals, be permitted to remain on the tree it will gradually become normal in chemical composition. There is no indication that such is the case, however, from the data shown in Table II and III in which the second sampling was made about two months after the first one. These fruit showed no improvement in acidity after this two-month period.

Our observations do not give any indication as to the stage in the development of the fruit at which arsenicals no longer modify the chemical composition of the fruit. Mature fruit however cannot be changed by imersion in solutions of arsenate of lead. This has been demonstrated by dipping mature seedling oranges on November 6th, in a saturated solution of arsenate of lead. The time of exposure to the solution extended up to 30 minutes. On analysis such fruit were found to be entirely unchanged.

It would be interesting from both a scientific and horticultural point of view to know the effect of various quantities of arsenic on the composition of Citrus fruit, the time of application, the form of arsenic that is most effective and if the same results would follow when applied to the soil. Experiments with phosphorus, antimony, and bismuth, which belong to the same family of elements, might lead to great discoveries.

MANY REQUESTS FOR SEPTEMBER BULLETIN STATE PLANT BOARD

Article by Chaffin on Citrus Insects Proves Popular with Citrus Growers

Gainesville, Fla. — Several extra copies of the September number of the Monthly Bulletin of the State Plant Board have been secured in order to meet the heavy demand for this number. The leading article for September is on identification of citrus insects in the field, and is written by Jeff Chaffin, assistant nursery inspector. It is this story which has caused the unusually large number of requests for the bulletin.

The subject of identification of citrus insects is treated in a very informal manner. The writer uses terms which anyone can understand or takes great pains to explain his technical terms. The article is the gist of a talk made by Mr. Chaffin during Farmers' and Fruit Growers' Week, which was held at the University during August. Doubtless, many of those who heard the talk at that time will be pleased to learn that they may now get it in printed form.

Many of the fertilizer companies and spray material concerns have written for copies of the bulletin for their agricultural workers. One letter from a California official requested a large number of the bulletins so that every field man could be supplied with one. Enough copies are on hand at present to supply all fruit growers of the state who ask for them. A postal addressed to the State Plant Board at Gainesville, will do the work.

In his article, Mr. Chaffin has demonstrated that it is possible to present scientific information in such a way that the laymen will become interested. In his work over the state as assistant nursery inspector, he has opportunities to observe people as well as insects. He has used his knowledge of entomology and his knowledge of citrus growers, and as a result has collected some worthwhile information, and presented it in readable form.

NEW ASSISTANT CHEMIST FOR EXPERMENT STATION

Darkis, F. R.

Gainesville, Fla.—F. R. Darkis, a graduate of the University of Maryland, from which institution he received his Ph.D. degree this year, has been appointed assistant chemist of the Agricultural Experiment Station. He will be stationed at the Citrus Experiment Station at Lake Alfred, and will work on certain chemical and physiological problems of citrus. His investigations at first will be centered around a study of dieback and its prevention.

Dr. Darkis has had three years of work as an analytical chemist in the Control Laboratories of the State of Maryland, and one year of investigation work with the Maryland Experiment Station.

He began his work with the Florida Experiment Station November 1, spending a few days at the Main Station at Gainesville familiarizing himself with his problem before he goes to the branch station at Lake Alfred.

From River Boats to Fast Railroad Trains

Three decades ago perspiring ox teams, bending heavily at the yoke, pulled their burden of citrus fruit over trails of heavy sand. Packed in barrels or any convenient container, the fruit was delivered at docks and loaded on the picturesque river boats of the early 90's.

Today speedy motor trucks, operating over hard-surfaced highways, replace ox teams, and fast railway trains replace the sidewheelers.

From the pioneer days of crude methods, through to the present age of highly developed methods of transportation—Wilson & Toomer Fertilizer Company has led all others in supplying fertilizers to Florida fruit growers and vegetable farmers.

Every Fall, when trees need nourishment to withstand the hazard of Winter, more growers apply Ideal Brands than any other kind. The application of plant food at this season also insures the production of a good crop next year. Let the choice of most Florida growers guide you in your selection of fertilizer. For the last 34 years, with hardly an exception, they have expressed a decided preference for Ideal Brands.

Our new booklet, "Fall Helps for Citrus Growers," written by Florida's leading citrus authority, Prof. Bayard F. Floyd, is now ready for distribution. If a copy has not reached you, write for it today.

Wilson & Toomer Fertilizer Company

JACKSONVILLE, FLORIDA

CITRUS COMMENTS

—BY—

Charles D. Kime, Orlando, Florida

This department is devoted to furthering horticultural interests of Florida. Letters of inquiry, discussion or criticism will be welcomed.

Read the Horticultural Proceedings

The Proceedings of the Florida State Horticultural Society for 1927 have been in the hands of the growers sufficiently long for them to be familiar with its contents. The articles in the Proceedings are always of interest to citrus growers because of the new questions which are discussed each year relating to horticulture and citrus growing, and also because of the latest angles that are given to these questions by the authors of the papers. The most outstanding paper in the Proceedings of 1927 is the one written by E. L. Lord of the University of Florida, and is on "Factors Affecting Quantity and Quality in Citrus Fruits." Mr. Lord has a very pleasing and exact method of stating clearly just what he means, and he has raised questions in his paper along the line that challenges the attention of every citrus grower. It seems very probable that the line of injury which he starts in his discussion is the most fruitful source from which the grower can secure information. The industry needs such men as Professor Lord.

Another paper of outstanding merit in the Proceedings of the Horticultural Society is the one on palms and their uses in ornamentation. This is short and has been preceeded by other papers by the same author.

Every grower in the State should have the Proceedings and read all of the citrus articles, with care, as in this way he can keep abreast of the latest thoughts each year on all of the points discussed.

From the Month's Correspondence

During the past month Mr. F. A. Gartner of Troy, Kansas, has, among other questions, inquired for specific information for beginners in citrus culture.

The actual decision of whether to grow or not to grow citrus fruits is something that should properly be left up to the individual himself. The points in favor of one section over another can, however, always be given best by those familiar with them, therefore the Florida grower is always glad to give his side of the discussion in his most patriotic manner.

Recent discussions on Florida rates reveal the fact that Florida is proportionately vastly closer to marketing centers than any other citrus area. With increased production it is bound to follow in time that Florida will have as favorable rates as any other section. In addition, there will always be the opportunity for shipments by water to the same points that are now served in the east by rail, but we do need more production before we are justified in going into this kind of shipment. Climatically, Florida can produce all varieties of citrus, excepting lemons, for commercial shipment, as good in quality and practically as cheap as any other section. We have gradually made substantial progress in varieties other than the round orange and grapefruit and are now shipping the tangerine, satsuma and Kings in sufficient quantities to establish a buyers market. With the advantage in distances with the climatic condition, and the advantage in varieties, Florida is in a commanding position from which it cannot be taken and just as quick as there is sufficient volume to justify the expense the necessary facilities for shipment will follow.

For one who will depend on his grove for his entire livlihood, ten acres and up would be the usual recommendation. I would want, however, to know more about the particular circumstances surrounding the purchase of a small grove before recommending that it be depended upon for one's entire living expenses. There is no question that any acreage properly handled will pay a good percentage on the investment, but there is always some doubt that a small acreage can be expected to pay in addition the living expenses of a fair sized family. We have many cases where twenty to forty percent on the actual investment has been realized each season on a small property, therefore under the right line-up one need have little hesitancy in making such an investment. The novice in fruit growing should be in such a location that he may secure expert advice in growing his fruit either from the County Agent or from some reliable individual. If he expects to do his work himself, this is sufficient. If, on the other hand, he expects to hire all labor on his property, a caretaking arrangement with reliable parties is much more practical than individual supervision. All or one of these arrangements are possible in some certain sections of the State.

It is both possible and practical from an economic standpoint to handle a citrus grove in the above suggested manner, though the grower should always estimate his income as a percentage of the total investment rather than some idea as to what he thinks he should make.

There has been much excellent advice given regarding choosing locations and fortunately most of them are the same, showing that our citrus information is becoming much more reliable. Certain soil requirements must be met, and it will be found that these soil requirements will vary from one portion of the State to another. Given a good quality of soil and sufficient soil depth above the highest water table that may be expected, the location may be one of personal choice regarding living conditions and marketing facilities, as in all of the sections where living conditions are desirable, one can locate good grove lands. That is, soils with the required soil depth and good heavy texture, and possessing air drainage which insures some protection against cold damage, and possessing good water-holding capacity with no natural toxic substances which might prove injurious. It is cheaper at the present time to secure cold protection by means of air drainage and a properly balanced fertilizer than in any other way.

Selection of Varieties

A selection of varieties can be

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BLUE GOOSE NEWS

Monthly News of American Fruit Growers Inc. *Edited by The Growers Service Department*

VOLUME 2.—No. 6. ORLANDO, FLORIDA, NOVEMBER 1, 1927 PAGE 1

CRACK FAST TRAIN IS NAMED FOR BLUE GOOSE

Perhaps the most notable compliment ever paid to the nationally famous Blue Goose trademark is found in recent action of the freight traffic department of the Pennsylvania Railroad in naming one of its crack, through perishable trains "The Blue Goose."

The Pennsylvania Railroad names a certain number of its most important fast, through-freight trains, instead of simply allowing them to be known by a number as is the ordinary railroad practice.These fast, through-freights are thus given much the same dignity as is bestowed upon its noted through-passenger trains; and they obtain much the same preferred handling to permit their close adherence to the fast schedules upon which they travel.

For instance, there is "The Packer," a solid, fast train of perishables, mostly meats, from Chicago to eastern seaboard cities. Then there is the equally famous "Man o' War," a rapid traveling through-train which carries only livestock eastward; and "The Comet" which laden with perishables and valuable merchandise travels like a streak from the eastern seaboard to St. Louis.

Now comes "The Blue Goose" which daily between eastern seaboard cities and Buffalo wings its way carrying perishables with the same clocklike precision which characterizes the fast passenger flyers.

In that connection the Pennsylvania Railroad states that these named through-freights on the system, "have attained monthly performances of 98% schedule time." So there is reliability of service as well as speed to distinguish them.

That the great Pennsylvania Railroad should select "Blue Goose" as typical of speed and reliability, and sufficiently indicative of a large volume of perishable business to so name this crack, perishable flyer is potent testimony to the high regard and general recognition which the Blue Goose trademark obtains in the perishable foodstuffs field.

FELLSMERE GROWERS INC. ADDED TO AFG RANKS

Fellsmere Growers Inc. at Fellsmere upon the lower East Coast is the newest addition to the ranks of the American Fruit Growers Inc. in Florida.

The new organization, of which S. D. Gaines is manager, already has begun operations. Its fruit is being packed under the Derby Winner brand with the Blue Goose trademark.

Fellsmere Growers Inc. has been organized to serve the needs of growers in that section where a considerable ctirus acreage now exists, and where younger plantings before long should add considerably to the present tonnage. The new organization will serve the foremost growers of the vicinity.

Fellsmere Growers Inc. will add to the volume of the already preponderant tonnage of Indian River citrus fruits handled by the American Fruit Growers Inc., which for the last half-dozen years has been the dominant factor in that section of the state, its tonnage at times equalling or exceeding the combined total of all other marketing concerns handling Indian River fruit. Like all other Indian River operations, Fellsmere will be under the general supervision of A. B. Michael of Wabasso, vice-president of the American Fruit Growers Inc. and one of the foremost growers and citrus men of the East Coast.

ALVA PACKING HOUSE LOCATION IS CHANGED

Alva Growers at Alva in Lee County, have been engaged in moving the long established packing house there from its old location on the banks of the Caloosahatchie River to a new location beside the rails of the newly constructed portion of the Seaboard Air Line Ry. as it traverses

Continued on page 2

SHIPMENTS TO DATE MAKE HOLE IN CROP

By F. L. Skelly

Up to November 1st passings at Jacksonville were 949 cars of oranges, 1,815 cars of grapefruit and 19 cars of tangerines, making a total of 2,783 cars. Last season to the same date passings were 515 cars oranges, 528 grapefruit and 1 tangerines, making 1,044 cars. Therefore, up to November 1st there is reported passing Jacksonville 1,379 cars more than last season.

At the time this is written, November 1st, weather continues extremely dry and hot, and the groves are in bad condition in a great many sections of the state with trees in wilt. The good size oranges that have been shipped, good quality fruit on the whole, have brought very satisfactory prices. Grapefruit shipments have been heavy when we consider the large amount of deciduous fruits on the markets and the heavy supply of grapefruit from Porto Rico. The market has held up exceedingly well, and fruit of good quality has brought very satisfactory prices, taking everything into consideration.

Shipments were heavy during one week, but have dropped down now, and we look for a steady, good market throughout the balance of the season on good quality fruit. If we get rains over the citrus belt and fruit gets into better condition in the near future it will have a very material effect on prices. However, without rains it appears there will be a preponderant amount of small sizes to ship before the Holidays of both oranges and grapefruit. There have been estimates of this season's crop varying from 34,000 cars to 42,000 cars. My own estimate sometime ago was that we will not ship over 34,000 cars of citrus fruit from the state. This will be 10,000 cars less than last season. However, with the weather conditions existing I am inclined to cut even this figure. Cer-

Continued on page 2

Adv.

BLUE GOOSE NEWS

OFFICIAL publication of the American Fruit Growers Inc., Growers Service Department, published the first of each month in the interest of the citrus growers of the state of Florida.

EDITORIAL ROOMS
502 Yowell-Drew Building
ORLANDO, FLORIDA

SHIPMENTS TO DATE MAKE HOLE IN CROP

Continued from page 1

tainly if we do not have better weather in the near future the crop is going to be reduced considerably.

Growers' ideas of prices are high and there is no doubt in my mind but that they are correct, if we get weather which will assure fruit remaining of fairly good quality.

California is practically through shipping Valencias. They do not expect to start on the navel crop until about November 15th and shipments of the new crop navels will be very light for the month of November. It is estimated Porto Rico has remaining from 200,000 to 225,000 boxes of grapefruit. It is reported most of this is of inferior quality and a large amount will in all probability go to the canning factories on the Island. Therefore, Porto Rican competition on grapefruit for the balance of the season can be considered negligible.

Apples are selling at high prices and while there is a large amount of inferior fruit on the market at the present selling at fair prices, most of the good apples are selling at extremely high prices and are going into storage. Grape shipments are dropping off rapidly and there is not nearly the quantity of grapes in sight for the balance of this season that there was last season.

On the whole we are very optimistic over the situation and believe extreme prices are going to be realized on good quality oranges and grapefruit. With the small crop we have in sight shipments should be well distributed throughout the balance of the season, however in order to realize best results for the Florida industry.

ALVA PACKING HOUSE LOCATION IS CHANGED

Continued from page 1

that section.

For many years the fruit packed there traveled by boat down the Caloosahatchie to Fort Myers, and from thence by the Atlantic Coast Line R. R. Inhabitants of the Alva section welcome the new rail transportation; and the Seaboard Air Line Ry. is putting into effect a prompt and speedy service which will make a worth while reduction in the time fruit is in transit.

FLORIDA GRAPEFRUIT RELIEVES DIABETES

Mr. R. A. Brand, vice-president of the ACL Railroad, in charge of traffic was an interesting visitor recently in the office of J. R. Crenshaw, traffic manager of the Orlando Division of the American Fruit Growers, Inc.

Mr. Brand is widely known, having for years occupied his present position and next year will be automatically retired upon reaching the age of 70. At that time the shipping public will lose a good friend at court, for Mr. Brand's fairness of attitude has been generally recognized by shippers.

Conversation developed the fact that Mr. Brand during the last few years has been a sufferer from diabetes. He said he has obtained most beneficial results from eating Florida grapefruit. It is his habit to purchase from twenty-five to thirty boxes at a time and he makes an invariable practice of eating three whole grapefruit daily. For his summer use he puts grapefruit into cold storage in his home city of Wilmington before the shipping season closes. Mr. Brand said that upon his retirement there is a possibility he will come to Florida, purchase a home and spend the balance of his days here.

HEAVY PREPARATION FOR YEAR'S SELLING

Unusual preparations have been made to assure the most effective selling effort possible in behalf of Florida citrus fruits during the present season by the American Fruit Growers Inc.

L. T. McGaughran, sales director of the national organization of the American Fruit Growers Inc., recently has spent some time in Florida, where in company with A. B. Michael, F. L. Skelly, and C. N. Williams, sales manager of the Orlando Division, he traveled about over the peninsula visiting the various packing operations of the American Fruit Growers Inc. and familiarizing himself with the characteristics and the selling advantages of the fruit from each section.

Mr. McGaughran's visit followed an intensive study by him of the records of sales from every section of Florida. Following his tour here he left upon a trip around the markets in the interest of Florida citrus sales before returning to his headquarters. Mr. McGaughran's person effort supplementing the market visits previously made separately by Mr. Skelly and Mr. Williams should be productive of results. This special effort is in addition to the usual carefully planned advertising and merchandising which each year features the forceful selling effort behind Florida citrus fruits sold under the Blue Goose and AFG trademarks.

In the selling operations of the American Fruit Growers Inc. there is a responsible sales executive in close touch with sales in every section of the country, and all selling effort is closely organized. When to this is added the stimulus of the effort of the sales manager of the shipping division where shipments originate it makes for an effective and forceful presentation to receivers, and binds the more than 150 selling offices in the U. S. A. and Canada into a harmonious and high-powered selling machine.

GEORGE D. WING IS BACK ON THE JOB

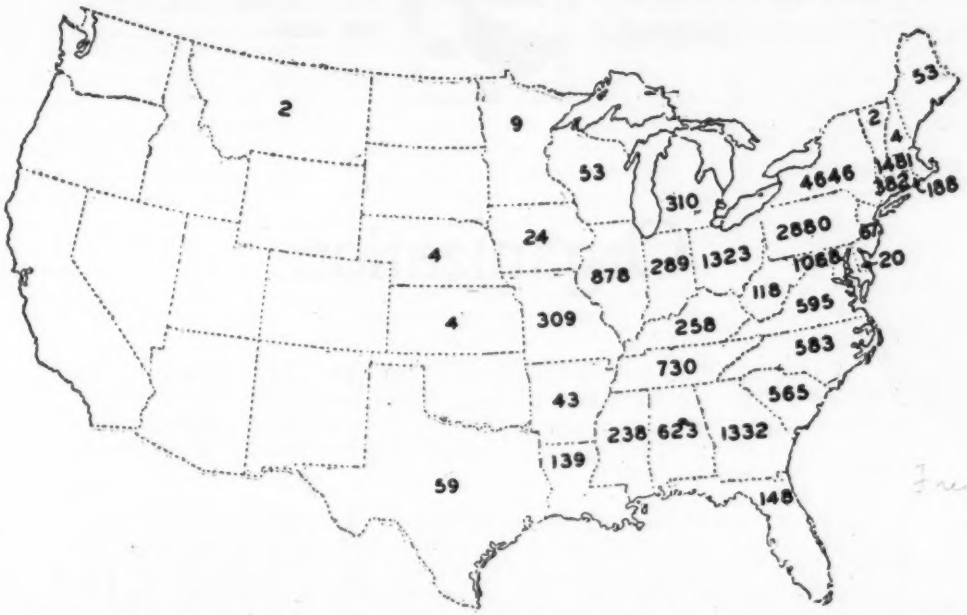
The many friends of George D Wing, of the accounting department of the Orlando Division of the American Fruit Growers Inc. will be glad to learn he is sufficiently recovered from his recent severe illness to be back in the Orlando offices.

Mr. Wing recently submitted to a severe operation in a Tampa hospital; and his recovery from it was somewhat slow.

"Shay—who's that guy?"
"Where?"
"Thanks."—West Point Pointer.

Adv.

RAIL SHIPMENTS OF FLORIDA ORANGES
FROM NOVEMBER 2, 1925 TO APRIL 30, 1926



The above map is from Bulletin No. 22 of the Bureau of Railway Economics, Washington, D. C., it shows the distribution of Florida oranges to the various states during the period named. Commenting upon this bulletin in the October issue of the Blue Goose News, J. R. Crenshaw, traffic manager of the Orlando Division of the American Fruit Growers Inc. claimed it to show very conclusively how the distribution of Florida oranges is crowded up against the Atlantic coast by the existing freight rate structure, against which Florida growers and shippers are contending. This map visualizes that fact. Note the heavy distribution of oranges to the Atlantic coast states. Note the very light distribution of Florida oranges to the first tier of states West of the Mississippi River, and the almost total absence of distribution any further West. This is most significant when it is remembered that, "Winter Haven is eighty miles nearer to Denver than Los Angeles is to St. Louis."

OUTSTANDING DIFFERENCES OF FARM AND FACTORY

Butler, Tait Dr.

Dr. Tait Butler, editor of the Progressive Farmer of Memphis, Tenn., presided at a joint fertilizer conference held in Louisville, Ky. recently between agricultural editors and fertilizer experts. It is reported to have been a most interesting conference.

During the debate at Louisville on some of the questions that involved the efficiency of American farms, the need for more federal assistance in research, demonstration and extension work relating to soil fertility and plant nutrition or the economic position of agriculture, Chairman Butler made some impromptu observations that are deserving of a lot of thought. In substance he stated that while sheltered industries have almost complete control of the factors determining success or failure, the farmer has no control over at least five of the important factors of production. Without attempting to quote Dr. Butler's exact words he showed that—

1. The manufacturer can produce the quantity of any product he may decide upon in advance—the farmer can not.

2. He can know his cost of production in advance with a high degree of accuracy—the farmer can not.

3. He can know his selling price in advance with approximate certainty —prices of nearly all the farmers important products are determined by world economic forces far beyond the farmer's control.

4. He can on very short notice speed up production in response to increased market demand—the crop farmer has one harvest a year.

5. He can on short notice slow production or stop it altogether should the circumstances of the market call for such action—the farmer can not.

Adv.

"Notice that Scotchman," she remarked to her escort as her eyes turned in the direction of a man seated at another table across the aisle.

"I see a man," replied her escort, "but I don't know that he's a Scotchman. What makes you think he is?"

"He licked his spectacles after eating his grapefruit."—Selected.

Visitor: "Are there any slick crooks in this city?"

Citizen: "Slick crooks! Man, one evening at a dance they stole my pants and hung weights on my suspenders so I wouldn't miss them until they had gone."—Carnegie Puppet.

Customer: "These eggs aren't fresh."

Grocer: "The boy just brought them from the country."

Customer: "What country?"—Reserve Red Cat.

UNIFORMLY

THE BEST

Organization

A Florida citrus grower telephones "Let's go." The manager of an American Fruit Growers Inc. packing house issues instructions. Next morning a picking crew under a capable foreman is carefully removing oranges and grapefruit from that grower's trees and transporting them to the packing house.

Toward sundown that day a puffing local freight engine pulls a carload of that same fruit from the switch and starts it northward—fruit which has been washed, polished and carefully graded and individually marked with the Blue Goose or AFG trademarks, packed ever so carefully in boxes again labeled with one or the other of these nationally famous trademarks.

Next day in Peoria—or mayhap in New Haven or in Sioux City—a man carrying a sheaf of telegrams, and papers on which the Blue Goose and AFG trademarks are prominent, accosts a man he calls "Bill" in the latter's place of business. He gets instant attention for he supplies more of the things "Bill" handles than come from any other single source. That carload of fruit meets "Bill's" needs. He signs an order. He has purchased and a Florida grower has sold that carload of fruit.

A hurrying telegram, a draft drawn upon "Bill's" concern put in for collection at an Orlando bank and a typical f. o. b. sale is complete. More than 150 other offices over the country simultaneously are performing their parts for other Florida growers—all bound together in one of the largest and most highly perfected organizations ever known in the perishable trade. That is AFG Service.

American Fruit Growers Inc.

Orlando, Florida

DEPENDABLE AFG QUALITY

Adv.

IMPRESSIONS

By The Impressionist

Emil Karst, head of the Rose Caretakers Assn. of Orlando which administers a considerable grove acreage in that vicinty, is a thorough individual. Apropos of Fall spraying operations Emil opines that numerous persons fail to obtain proper pest control simply because they fall short of thoroughness in their sprayings. Dry leaves, left untouched by spray materials, shelter sufficient pests to nullify quickly the spraying operations. To watch Emil Karst checking the work of a spraying crew would be an education to some growers who apparently feel that a certain amount of spray discharged in the general direction of the trees is sufficient. It takes a thorough workman to earn his approval, and many a man whose work had satisfied other growers has found himself fired by Emil Karst with a suddenness which left his head swimming, all because of "a few dry leaves." Our impression is that here is one who gets his full money's worth, and a maximum result, from whatever spray materials he uses. No wonder his groves are clean.

Now that is a fair boost for Emil Karst without getting in the way of Charley Kime and his horticultural department writings. We have no desire to do that. We are no blooming horticulturist, but we know one when we meet him and we have a most wholesome respect for Charley Kime and his opinions in that direction. By the bye, we have seldom encountered such unanimous approval and general congratulation as has recently fallen to THE CITRUS INDUSTRY in obtaining the services of Charley Kime to carry forward the work which the late Roy E. Lenfest for several years carried on so splendidly, and to such great advantage to the subscribers of this publication. To the minds of the scientific men and a great body of growers it seems Charley Kime is the one logical person to take up this important work. Our impression is he is the right man in the right place.

Passing through Palatka we make a stop for lunch at the cafeteria. In comes S. C. Warner, long identified with the citrus industry in Putnam County. Not having been in contact for about four years we get together for a brief reunion. We are surprised to find that two years ago he sold all his holdings on the East side of the St. Johns and retired, is living the life of Riley at Coral Gables. It doesn't seem right. To our mind Mr. Warner was always one of the most permanent human figures connected with things citrus. He began his operations near East Palatka in 1877, that is quite a spell back now. He and his brother were big frogs in the Putnam County puddle for a great many years, and the Big Freeze of '95 did not extinguish their activities as it did many others in that vicinity. Theirs is the credit for the beginning of the development of what we know now as modern packing house machinery. They also patented a machine for wrapping oranges which they had in operation in their house for a number of years. For more than a dozen years Mr. S. C. Warner was a director of the Florida Citrus Exchange, and was one of the most valuable members of that board. A thorough conservative, his unprejudiced views coupled with his ever quiet and extremely gentlemanly demeanor gave him a high standing there. It is no secret that the late Dr. J. H. Ross valued his counsel perhaps above that of any other individual. It develops that our meeting in Palatka is simply a coincidence, he having come up for a few days on business. We consider it, for us, a happy coincidence.

Sitting at table at a restaurant in Winter Park, and who should walk in but J. J. Hinsman. He is the man who headed the first "specialty crew" to work among northern retailers and consumers on behalf of Florida citrus fruits, supplementing the newspaper and magazine advertising and carrying on an educational campaign on behalf of these Florida products. It was excellent work they did, even though at times they sent back photographs of the crew members wallowing about in snow drifts up to their knees, in order to visualize their handicaps to the Florida men who were closely watching the effort. This was in the season of 1918-19 when the first work was done. It develops that now Mr. Hinsman is at Lakeland, in charge of credits and collections for Grady Dean's Non-Acid Fertilizer Co. He doesn't say so, but we gather he is just as pleased to be right here in Florida the year 'round and thus to escape the snow drifts.

Up at Howey-in-the-Hills on October 14, a dinner given by W. J. (Bill) Howey to the members of the South Florida Press Association who were in semi-annual session nearby at Clermont. A mighty fine and very enjoyable dinner and everybody grat-

Continued on page 25

Wessels Electric Water Heaters

Provide warm water for washing fruit, which is far more effective than cold water. Also make possible in cold weather warm solutions for cleaning and preserving fruit. Convenient, serviceable and entirely reliable.

Southeastern Electric & Supply Co.

Orlando

Light Plants, Automatic Water Plants and Electric Refrigerators
CHARLES GREENE CO.
1221 Florida Ave. Phone 3477
TAMPA, FLORIDA

Freight to Freight

Robinson Compares Freight Rates

Analysis by J. Curtis Robinson, Secretary-Manager, Growers and Shippers League of Florida, of Bulletin 22 Issued by the Bureau of Railway Economics

Florida Growers and Shippers should not be mislead by Railroad propaganda, such as that recently appearing in the Press eminating from Bulletin 22 issued by the Bureau of Railway Economics, to believe they are living in paradise, when if they did it would only be a Fool's Paradise. By that I mean, it would only be one without adequate faculties to reason, who could be lulled into the belief that the rate structure under which the shippers of Florida must distribute the citrus fruit shipped from this state, is as elastic or comprehensive as the structure applying from California.

The Bulletin would attempt to demonstrate that the freight rate has no effect upon returns to citrus shippers. Our growers are too wise to be mislead in that respect, but they might not fully comprehend the difficulties encountered by shippers in making distribution of Florida citrus fruit, compared with the minimum effort necessary to distribute California citrus, due to their blanket freight rate facilities.

The Bulletin attempts to show that freight rates have no detrimental bearing upon distribution and therefore, a higher rate from Florida to Western Territory than is applicable from California to destinations in Western Territory should not, according to the statistics contained in the bulletin be considered a reason for lack of greater distribution from Florida.

A very interesting comment and analysis of Bulletin 22 by Mr. J. R. Crenshaw, Traffic Manager of the American Fruit Growers, Inc., Orlando Division, appears in the Citrus Industry, No. 10, for October.

As pointed out by Mr. Crenshaw, the bulletin, itself clearly discloses the handicap to Florida shippers in making distribution in Western Territory, when the map in the Bulletin shows only 593 cars of oranges going to the 22 states located in the territory west of the Mississippi River.

The Bulletin shows the distribution of citrus from Florida and California from November 2, 1925 to April 30, 1926. During this period there were only 2 cars from Florida distributed in Montana. Comparing the rates to Butte, Montana from Los Angeles, California with the rates from Lakeland, Florida, which the Bulletin selects as representative rate point in Florida, the rate from Lakeland is 49.5 cents per box higher than from Los Angeles. There are, however, 35 groups out of a total of 63 groups in Florida from which the rate to Butte is higher than from Lakeland.

The bulletin shows only 4 cars went to Nebraska from Florida, 4 cars to Kansas and 59 to Texas. The rate from Lakeland, Florida to typical destinations in these states is from ½ cent per box to 35 cents per box higher than from Los Angeles. Omaha, Nebraska is a typical destination for Kansas and Nebraska. The rate to Omaha from Lakeland, Florida, group 11, and from 36 other groups or a total of 37 groups out of a total of 63 groups of origin in Florida is from one-half cent to 27½c per box more than from all California origin points.

Comparing the distribution of 59 cars in Texas with 309 cars distributed in Missouri. The rate from Lakeland to Dallas, Texas is 8 cents per box higher than from Los Angeles to Dallas. In fact the rate to Dallas from 49 out of the 63 groups in Florida is higher than from Los Angeles. The rate to Kansas City from 25 groups in Florida is higher than from Los Angeles, and the rate from Lakeland to Kansas City is 5 cents per box lower than from Los Angeles. While the rate to Kansas City is higher from only 25 groups in Florida than from Los Angeles, the rate to Dallas, Texas is higher from 49 groups in Florida than from Los Angeles. This helps to account for a greater distribution of Florida oranges in Missouri than in Texas, then too, in Texas we must meet competition with oranges grown in that state which is not present to such an extent in Missouri. The chief handicap which Florida must overcome in Missouri, however, is the ability of California to route all of its cars thru Nebraska or Missouri to the eastern markets and offer them for delivery in Missouri at no higher rate than it costs to transport a car to Denver, Colorado from Los Angeles. California can keep cars on track available for delivery any day, at any point in Missouri, and if not sold can divert the car and move it or to any other market up to and including New York City without any additional cost in freight. This is not true in moving citrus from Florida. If rejected in St. Louis and moved further west to Omaha, for instance, it costs Florida shipper 24 cents per box more than if delivered in St. Louis.

The Bulletin shows only 24 cars were distributed in Iowa. Taking Des Moines, Iowa, as a representative destination we find the rate from Lakeland is one-half cent per box more to Des Moines than from Los Angeles. There are, however, 36 groups of origin in Florida where the rate is in excess of the rates from Lakeland. From some of these points the rate is 27 cents per box higher than Lakeland, or 27.5c more per box than from Los Angeles.

The Bulletin shows only 9 cars distributed in Minnesota. Like the rates to Des Moines, the rates to St. Paul and Minneapolis are one-half cent per box more from Lakeland than from Los Angeles and the rates from 37 group points, including group 11, in which Lakeland is located, are higher than from Los Angeles.

The Bulletin shows out of 19754 cars shipped from Florida during the period covered, only 3% were distributed in states where 30% of the population is located, leaving 97% to be distributed to territory including 67% of the population, with California excluded.

Analyzing the territory available to Florida still further, we find that the population of eight Southern States, Alabama, Kentucky, Mississippi, North and South Carolina, Tennessee, and Virginia contain only 18,420,763 people or 17.3% of the population of the United States. To this territory the rates from Florida are with few exceptions lower than from California; to some destinations in Tennessee, North Carolina, Virginia, Kentucky and Mississippi, the rates from certain points of origin in Florida are higher than from California.

By assuming that the rates from Florida generally to the Southern States mentioned are lower than from California, where according to the bulletin 26.6% of Florida oranges

Continued on page 26

W. S. McCLELLAND, President
CHAS. B. STERLING, Secretary

OFFICES: LEESBURG, FLORIDA
EUSTIS, FLORIDA

LAKE NURSERY COMPANY

INCORPORATED $300,000.00

OLDEST SOUR NURSERY IN FLORIDA

EUSTIS, FLA.

November 5, 1927.

To Non-Prosperous
Citrus Growers:

We have heard too much of ''chaotic citrus marketing,'' and that there's ''no money in growing citrus.''

Many Florida citrus growers are wondering what the talk is all about. They wonder what ails the complainers.

They do you an injustice. They think you are all wrong, when the chances are its the trees in your groves that are wrong. You may be all right, but, of course, if your trees won't raise good commercial fruit you cannot make a proper profit.

However, you ought to be fair- to Florida, to the business of citrus growing, to yourselves.

Study returns of the practical growers near you who have good trees on sour orange rootstock. Study those communities where sour orange plantings predominate all others.

Then ask yourself if your groves are, like theirs, ''quality fruit factories,'' or should be classed as ornamental plantings? Isn't the rub right there-not in the marketing? Don't envy successful growers. Instead follow their examples, even if you practically have to begin over again.

''Knocking'' only depresses market prices of our fruit and disorganizes things generally. It helps no one.

Drive up here to Lake Nurseries, on the main highway East of Leesburg on the way to Eustis. Let us show you the first requirement of a profitable citrus tree. To assure profitable citrus production you have to go right to the bottom of things at the beginning- right to the rootstock. For profits in Florida you must plant sour orange rootstock. Even then there are some important differences in sour orange, as we shall be glad to demonstrate for you.

Yours for Profit$,

LAKE NURSERY COMPANY,

wsm-a W. S. McClelland, President

Radio Broadcasting

Radio Broadcasting

Chase & Co., Orlando, Florida, prominent citrus marketing agents, have issued the following announcement of the reopening of their broadcasting information on citrus markets:

Chase & Company has resumed its radio broadcasting program and we give you below the necessary information with regard to it. Broadcasting this year will be from only two stations—WDBO, Orlando, Florida, and FJAX, Jacksonville, Florida. The Jacksonville broadcasting will be started up probably next week and further details will be given.

Station WDBO, Orlando, Florida is operatnig on 288.3 meters (1040 Kcs). It should be found on your dial approximately half way between WPG Atlantic City and KDKA Pittsburgh. WDBO has increased power and erected a new antenna system which is one of the highest in the state of Florida, being over 120 ft. above the ground. This station now has a daylight range of approximately 100 miles and a night range of about 2000 miles. The schedule of broadcasting each week will be as follows:

Mon. 9:00 P. M. (E.S.T.) Weekly talk by A. M. Pratt and Auction Reports.

Tues. 9:00 P. M. Daily Auction Reports.

Wednesday, Silent.

Thurs. 1.00 P. M., Daily Auction Report for Previous Day.

Thurs. 9:15 P. M., Daily Report for Thursday.

Fri. 9:00 P. M., Daily Auction Report.

Sat. 9:00 P. M., Daily Auction Report.

Sun. 11:00 A. M. 4:00 P. M. 7:30 P. M. Religious Services and Music.

Our Florida agents are particularly requested, if convenient, for them to listen for the 1:00 P. M. market reports on Thurs. and give us a special report on reception at that time.

Station WDB0 also gives the time signals at 12:00 o'clock noon every day except Wednesday and Sunday. We would like to have a letter from each of our agents advising whether or not he is equipped to receive these reports by radio, so we will know who is in position to listen in. The broadcasting of the market reports is being done later this year than the year before, which should considerably increase the range of the reports during the evening hours. Reception reports from our Northern brokers and agents will also be very much appreciated.

CITRUS COMMENTS

Continued from page 16

made with some degree of assurance by a careful checking of the marketing reports. These varieties which may be thought important from a planting standpoint today may prove to be of less importance by the time a grove is brought into bearing. It seems, however, that we have not yet reached a point where either our early or late varieties have been over planted and it is very certain that such varieties as tangerines or Kings can be planted for some years to come without over-doing the possibilities.

The usual recommendation on orange varieties at the present time is Parson Browns for an early fruit and Valencias for a late fruit. Due to more or less temporary conditions grapefruit is not usually recommended as a desirable variety, though if properly handled there is no reason why a grapefruit grove should not pay a good percentage on its cost. In order to take advantage of the grapefruit market one must expect to hold the crop late, which means that it should be of the Marsh Seedless variety, and one should also expect to have heavy crop only every other year because of the late holding interfering with the set of bloom buds of the ensuing year. Mid-season fruit whether of seedling or budded variety, can be marketed at a good price if it is of sufficiently high quality. There is considerable discussion at the present time with regard to varieties on certain stocks throwing poor quality fruit. It might be that the stock, plus the soil and the variety, cannot be made to produce good quality fruit, but, in the majority of cases the quality has been vastly improved by fertilizer. Therefore, a decision cannot be always made regarding a certain property and the fruit it may produce until the fertilizer has been given a fair trial. Often the difference between a low price for a crop of fruit and a high price is only a matter of fertilizing and insect control. Therefore, while at the present moment we are planting early and late varieties, it must be remembered that the same rule applies in our mid-season varieties. Therefore, a grower, anticipating a satisfactory income from his fruit, must also learn the art of quality production.

For a small grove not less than three hundred trees should be of one variety, and preferably all should be of the same variety so as to

SPRAY
for Clean Trees

If you have failed thus far this year to spray your trees, do it now and do it with VOLCK.

An application now will check the scale, put the trees in condition for healthy spring growth and bud development, and prepare the way for Bordeaux control of spring melanose.

Florida growers in increasing numbers are protecting their crops by the use of VOLCK.

CALIFORNIA SPRAY-CHEMICAL CO.
O. R. BLOIS, DISTRICT SALES MANAGER
61 W. JEFFERSON ST. ORLANDO, FLORIDA

VOLCK
—the scientific spray

150-318

100 LBS. NET
CHACO FERTILIZERS
CHASE & CO.
SANFORD, FLA.

"JUST PLUMB FULL OF GOOD PLANT FOOD"

FEED YOUR GROWING THINGS CHACO

CHACO FERTILIZERS
ARE GOOD FERTILIZERS

CHASE & CO.,
SANFORD, FLA.

FERTILIZER MANUFACTURERS
GROWERS SUPPLIES

insure a unity of treatment and sufficient fruit each year for car load shipments. Averaging through a series of years the income will be better than where it is divided up among several different varieties. Of course, for home use any number of varieties may be planted, and certainly one should grow their own lemons.

Comments From Here and There

It is freely predicted by reputable authorities that the 1927 and '28 seasons will be the longest on record due to the great amount of June bloom. On the other hand, the short crop has already pulled practically all of the grapefruit off the east coast, at least all of desirable size have been shipped. It may be that an active demand will cut our season shorter than we have anticipated.

The United States used about 240,000 tons of Potash. According to the Fertilizer Review, about 80,000 tons are now manufactured in this country. With better and cheaper fertilizers, we can grow better quality fruit at much less cost. Fertilizer represents about one-half of the production cost of an old grove. November is a good month for the fertilizer industry and for the insecticide companies, as it is the month in which groves are fertilized and Fall spray work can be made.

The citrus fruit buyers are looking for bright fruit of good quality and are willing to pay for it.

IMPRESSIONS

Continued from page 21

ified at not being talked to death. Two most interesting exhibits, one of orange juice preserved in its natural state, the other of grapefruit segments in glass preserved without the use of either sugar syrup or benzoate of soda, both being laboratory experiment products worked out looking to the end of utilizing the off grade fruit from the big plantings there. By the way one of Bill Howey's men said in talking to a few of us privately that there are now, if memory serves correctly, approximately twenty-three thousands acres of citrus of Howey plantings now round about there. Of these something like twelve thousand acres are now in bearing or are just about to come into bearing. Couple the plantings near Howey-in-the-Hills with the large acreages planted in Polk County and sold to outside buyers by Bill Howey from ten to eighteen years ago, and our impression is he is the one outstanding grove planter and developer of Florida.

C. C. Commander, general manager of the Florida Citrus Exchange, the first man to hold the place since the office and the title were abolished with the passing of Wm. Chase Temple, sitting in his office in Tampa. It is a rather simple and simplified room, to suit the tastes and the somewhat direct methods of its occupant. We were to an extent familiar with the situation he inherited; but we listen with keen interest to figures he reveals. Bringing the big cooperative organization out of the debt in which he found it wallowing upon taking office has been no small job. We are somewhat amazed to learn of the rapidity and thoroughness with which it has been accomplished. Our impression is that here has been a major accomplishment within the period of two years, one which merits the sincere apperciation of the membership of the organization and which will compel the respect of the business men and bankers of the state.

HIATT SUCCEEDS JENKINS AS LAKE COUNTY AGENT

Gainesville, Fla.—C. R. Hiatt, who for the past two years has been employed as county agent in Marion County, has been transferred to Lake County. He begins work at Tavares November 1.

Mr. Hiatt is a native of Florida, and is a graduate of the Agricultural College of the state University. In his work in Marion County he has done much to promote livestock and dairy work. He succeeds E. W. Jenkins, who recently resigned as agent in Lake County.

FRUIT TREATING PROCESS

WE OWN THE EXCLUSIVE RIGHTS FOR THE ENTIRE UNITED STATES in the process of treating citrus fruit with a mixture of paraffin and gasoline or similar volatile solvent covered by **McDill United States Patent No. 1,630,129, granted May 24, 1927.**

To packers desiring to treat their fruit by this process we are prepared to grant the necessary permission on suitable terms. Applications will be considered in order of receipt.
Address all inquiries to

Brogden, Ricketts & Haworth Company
Box No. 338 Winter Haven, Florida

Your Home Orchard

Now is the time of year to add to it—giving you a variety of deciduous as well as citrus fruits.

Peaches, grapes, pecans, figs, persimmons, mulberries, pomegranates and orchard blueberries are all being successfully grown in Florida, both for home use and in increasing commercial quantities.

The time to plant all such deciduous stock is during the winter months of December to February. Place your order now or write us regarding your particular needs.

Reasoner Brothers'

ROYAL PALM NURSERIES

Oneco, Florida

Your copy of our new 1928 catalog is now ready.

Trim Your Trees Yourself

It's easy if you use a Bartlett Jointed Tree Trimmer with a compound lever. Saves cost of buying several trimmers of different lengths. Prices F.O.B. Detroit. 8 ft. (2 sections) $6.60; 12 ft. (3 sections) $7.40; 16 ft. (4 sections) $8.20.
Bartlett Manufacturing Co.
438 E. Lafayette Ave., Detroit Mich.

ROBINSON COMPARES FREIGHT RATES

Continued from page 22

were distributed, it only leaves 50% of the population of the United States to which to distribute 70% of Florida's citrus out-put, except at rates which are considerable higher than from California.

Right here are some facts which all of the growers do not fully appreciate, and that is that the territory north of the Ohio and Potomac Rivers is divided practically into two territories; that lying east and west of an imaginary line drawn from Buffalo down thru Pittsburg and south into West Virginia. A car sent north from Florida through the Potomac Yard gateway, Washington, D. C. may be distributed in the area lying east of the Buffalo-Pittsburg line. If sent west of that line, a local rate is assessed in addition to the rate from Florida to Buffalo or Pittsburg. A car sent north thru Cincinnati gateway, must find its destination west of the Buffalo-Pittsburg line, or be subjected to the penalty of a local rate beyond Buffalo or Pittsburg to its ultimate eastern destination. Not so with a car from California. It may move east through St. Louis or Chicago to Pittsburg or Buffalo and go on to New York or Philadelphia paying no attention to the barrier which surrounds Florida's distribution, because, for California no such barrier exists. A car from California may move through New Orleans, be offered for sale to all markets of the South, and, provided it has not been sent too far east, may move up to Cincinnati and on east through Pittsburg to Philadelphia or New York, at a rate to New York of $1.55 per 100 lbs., the same as would apply via St. Louis or Chicago, and no more than is charged from California to Denver.

It can be seen therefore, that the territory containing 50% of the population in which Florida must deliver 70% of its oranges is really divided into two parts, which in itself is a terrific handicap for Florida distributors to attempt to overcome.

The rates to these eastern cities are, from many origin groups in Florida, actually higher than from California. If distance hauled were taken into consideration in the comparison, Florida's handicap would appear more pronounced.

There are 63 groups of origin in Florida from which rates on oranges apply, while the entire state of California is blanketed in one origin group. California's privileges for distribution are practically unlimited and unhampered, while Florida is hedged about with restrictions in routing and faced with various penalties in the way of increased cost for transportation, as the point of origin is furthest south of Jacksonville and the point of destination is furthest north of Jacksonville. In the face of all these many handicaps to Florida distribution, the wonder is that our distributing agencies were able to make the showing that they did in the 1926 season.

The bulletin 22 and the map therein showing the very limited distribution by Florida in territory west of the Mississippi River shows in no uncertain terms that Florida is parctically eliminated from extensive distribution in western territory, which is due primarily to the existing Freight Rate Structure as I have pointed out. This would seem to argue as strongly as anything can in support of the Complaint of Florida shippers against this very unjust rate situation.

The predicament in which Florida is situated when it comes to distribution of citrus fruits and vegetables is now a matter of record before the Interstate Commerce ommission, having been presented to them by the Growers and Shippers League. We are hopeful that the decision of the Commission when announced, which should be in the next month or two, will be such as to enable the Florida Shippers to widen their markets and make distribution of the 1927 crop on more fair and equitable rates.

NEW BIRD REFUGE IN FLORIDA

By recent Executive order, the President has transferred from the War Department to the Department of Agriculture as a refuge for birds a portion of the Fort Mantanzas Military Reservation in the State of Florida. The area consists of a group of marsh islands lying in the Mantanzas River about 15 miles south of St. Augustine, Fla., and serves as a nesting place for wild fowl, chiefly terns. Shearwater nest in the vicinity and possibly occupy some portions of the reserve area. The administration of the new refuge is placed under the bureau of Biological Survey.

A community in South Carolina recently held a junk bonfire as a means of beautifying the countryside. Florida communities might profit by the example.

WARTMANN NURSERY COMPANY

is now offering for immediate booking bearing Dancy Tangerine buds that will caliper one inch to one and one quarter inch, sitting on six year old roots at 40c each in lots of 100 f. o. b. Ocala. Must be moved from leased land.

Wartmann Nursery Company

P. O. Box 167 Ocala, Fla.

FERTILIZERS FOR FLORIDA FRUITS AND FARM CROPS

SIMON PURE AND GEM BRANDS

"TIME TRIED AND CROP TESTED"

Forty years Satisfactory service to Florida Growers

Long dry spell about Over.

Order now and save money by getting our REDUCED JUNE FIRST price list before buying. Fair prices, Quality Fertilizers, Prompt Service.

E. O. PAINTER FERTILIZER COMPANY

JACKSONVILLE, FLORIDA

HOTEL HILLSBORO

Tampa, Fla.

TOP O' THE TOWN

European Plan, Fireproof 300 Rooms With Baths

THE CENTER OF TAMPA

WATER REQUIREMENTS OF FLORIDA CITRUS FRUITS

Continued from page 9

of the non-cultivated plots, that is, there has been a somewhat more rapid loss of moisture from the cultivated plots than from the non-cultivated plots. These differences, however, are believed to be within the limit of error in the determination.

Viehmeyer and Beckett, of the University of California, found that, under field conditions, the differences in the losses of moisture between cultivated and non-cultivated soils were negligible. Hence, aside from turning under fertilizers and cover crops, the necessity for cultivation on the more open soils might be reduced to zero providing that weeds did not grow and that the ground always took water well. This is particularly significant to Florida citrus growers since the majority of our grove soils are light, sandy ones which have a limited capillary action and, by reason of their loose texture, are obviously self-mulching. In the case of heavy soils, however, much harm is often done by cultivating groves when the soil is altogether too wet, which, by all means, should be avoided.

In California, where soil moisture conditions in relation to citrus trees has been studied intensively for a number of years, it has been found that equally good yields and tree condition resulted regardless of whether groves were plowed once a year, several times a year or never plowed. In fact, one of the most profitable and productive lemon groves in that state has not been plowed in 15 years.

In agriculture the world over the killing of weeds is the most important purpose of cultivation. Weeds compete with the growing trees for moisture and plant food. Even in irrigated sections, where the competition for soil moisture can be controlled by extra applications of water, it has been shown that the competition of weeds for plant food is very severe. It is, therefore, not advisable to allow weeds or a cover crop to compete with the tree crop at any critical period when the trees need large amounts of water and quickly available plant food.

To illustrate how severe weed competition for soil moisture may become, the following experiment may be cited. In tank experiments conducted by Prof. Viehmeyer, of the University of California, the loss of water from a weed-free and uncultivated tank was 57 pounds in 4 years, while the loss of water from a similar tank of the same kind of soil in which three morning glory plants were growing was 704 pounds in 144 days. The loss from the tank with the morning glory plants for one period of but 23 days amounted to 120 pounds, or more than twice as much as that from the tank of bare soil in 4 years.

In view of the recent studies of soil moisture in relation to citrus trees, it is obvious, therefore, that cultivation operations in Florida groves should be reduced to the very minimum for accomplishing the purposes already enumerated. To whatever extent the purpose of cultivation may be accomplished without stirring the soil, cultivation may be reduced or, in some instances, eliminated entirely. This should effect a considerable saving of time and money and improve the quality of the fruit, especially in the groves of the ridge section where cultivation is practiced excessively. Groves repeatedly harrowed thruout the dry season of the year so that not a sprig of grass appears may be very pleasing to the eye but are not necessarily the groves that produce the greatest returns on the investment. Cultivation in excess of that required to conserve the soil mois-

Continued on page 30

Ocoee, Fla.
Oct. 14, 1927.

American Cyanamid Sales Co.,
1235 No. Orange Ave.,
Orlando, Fla.

Gentlemen:

The fumigation of my grove last November, of 22 acres, has proven to be most satisfactory inasmuch as an examination of the trees on this date shows them to be more clear of scale and other pests than at any previous fall.

The fruit is bright and being clear of scale will raise the grade, as was the case last year, when I marketed some very fine fruit. The Temples sold in auction at from $6.00 to $8.00 per box at a time when ordinary fruit was bringing from $3.50 to $5.00.

I wish to say that the remainder of my grove which was not fumigated and was sprayed is very badly infested with scale, causing some fruit to drop already, also lowering the grade of same very materially.

I highly endorse fumigation and believe it will become more popular as grove owners realize the benefits accruing from it.

Yours truly,
Signed B. D. Bennett.

RED AND PURPLE SCALE

controlled by

Fumigation

Scale insects so prevalent this season are easily killed by the gas which reaches all portions of the tree under the tent, effecting a positive control.

Write for booklet "Florida Fumgiation Facts". It tells how and why it will pay you to Fumigate.

American Cyanamid Sales Co.

1235 No. Orange Ave. Orlando Fla.

Clearing House Purposes Explained

By A. M. Pratt, Sales Manager, Chase & Co.

The Clearing House Plan that has been talked of so much for our citrus business is not one where the Clearing House itself sells the fruit. It is rather a plan whereby members will have the benefit of vital information, which is impossible otherwise. The Clearing House is a fact-finding body which disseminates daily to the members, the results of its analysis of the entire membership's business. Every member will know how much of each variety the other members will be shipping from week to week, what each member has shipped, and the prices realized by all members. The purpose, therefore, is purely that of bringing about more orderly intelligent marketing, and an interchange of fundamental marketing data—an attempt to know, instead of guess, in our marketing problem.

Nothing is of more importance to growers and shippers than proper distribution, not only geographically but chronologically over the season. Just ahead of us we have the big rush period. There has been no season, for many years, where sometime between November first and December fifteenth, picking and shipping has not been so overdone as to bring prices down much below the season's average. With this tendency so obvious, one would think the growers in protecting their own interests would individually put a stop to repeating this error year after year.

But several ideas interfere, as follows:

Possible damage by frost

Loss by dropping

Loss by wind and drought

Loss by lower grading

Relieving the trees to better set the new crop.

These are legitimate reasons and must be considered. However, probably the greatest reason is the hope of getting prices existing at the time the grower decides to move, and the failure to realize that with other growers also generally deciding to move at the same time, a mass of supplies is thereby initiated where lower prices become inevitable, by the time the fruit is sold and accepted.

On top of this, in fairness to growers there isn't the frankness there should be between shippers and growers about probable lower prices. Too frequently a shipper offers greater assurance as to prices being maintained than the situation warrants. This is done, 'tis true, in self-protection. If a shipper talks less prices than his competitor, a grower is inclined to market through someone who talks bigger prices, or makes greater promises. And finally all of us do not look ahead as clearly as we should.

The public and growers generally fail to appreciate the handicap of time. When a shipper talks with his grower, the market on cars rolling

Smiths Ethylene Regulator

It assures you success when using Ethylene

To successfully color citrus fruits with Ethylene, the flow of gas must be accurately controlled. The Smith Ethylene Regulator gives you perfect control of the gas release.

It is a sturdy reliable instrument, simple in construction and easy to operate. No valves to turn. No piping or extra tanks required. You have a compact portable unit. It can be furnished to fit any size or make of cylinder, and the guage can be calibrated to indicate any desired flow. Price $22.50 F. O. B. Minneapolis.

GET THE FACTS TODAY

Smith Welding Equipment Corp.

2631 4th St. S. E. Minneapolis, Minn.

Citrus Growers Use

NICHOLS TRIANGLE BRAND BLUESTONE

(Copper Sulphate)

To stop the splitting of fruit caused by Dieback and Ammoniation

The use of Triangle Brand Bluestone will insure you against loss in your grove operations. It is the quality standard and generally used by Citrus growers and Truckers for Dieback control and the preparation of home made Bordeaux Mixtures for spraying purposes.

Insist on NICHOLS TRIANGLE BRAND and assure yourself of the best.

NICHOLS COPPER CO.

25 Broad St. New York

may be in fine shape, and he may have orders ahead at satisfactory prices. The grower decides to pick. It not only takes a few days to pick and haul, but it must be gassed for two or three days to properly color the fruit, then packed and shipped. Four or five days easily elapse before his car is ready to move. Then the sizes are wired, and usually another two or three days elapse before the wires interchanged result in a sale, subject to inspection at destination. Seven days after the grower decides to pick, the car may be sold—and then sold only subject to inspection at destination. Ten days to two weeks after the grower decides to pick, the shipper knows whether the car has been accepted at destination, and the sale is actually consumated for the grower.

By the time the car is shipped, frequently the shipper, as well as the trade, see shipments are climbing. Here again we run into a time handicap. We have to look backward to try to judge the future. We learn today what was shipped yesterday, but without a pooling of interests through a Clearing House, we do not know what is being picked today, or yesterday, or the day before yesterday, or the day before that. Because of this we are suddenly jolted with the fact that shipments are twice as heavy as they should be. Its too late to remedy matters then. The harm has been done.

Only one thing can remedy this short-sighted policy—a getting-together of the car-lot shippers to agree what they will do as to volume, so that each shipper will know ahead of time the volume that it is intended by all operators to pick. Then the shipper and grower can know before it is too late, whether he intends picking his crop when others will be picking so heavily as to force prices down below a sensible basis.

The Clearing House, if backed up by enough shippers, can by daily interchange of picking plans, at least know what shipments will probably be by the time their own fruit will be ready to market and ship. They can go still further and control to a great extent these shipments by pro-rating their shipments, if necessary, when the tendency is towards over-shipment. Without such group action, it will continue to be impossible to accurately forecast the probable supplies available to the trade, and we will continue to be four or five days behind our real supply problem.

Without such joint action the buying trade lose confidence and the market drops, frequently due to fear, below what the actual increase in shipments warrant. The trade want us to regulate our business. It will pay them as well as the growers to do so.

How many shippers will join the Clearing House is yet to be determined. The Fruitman's Club will soon be hearing the report of the Clearing House Committee, which met last week, to formulate its final recommendations. Some good is bound to result from the interest and effort so far given. Much good is possible. How much will be accomplished is dependent upon the support given and the ability of tentative members of the Clearing House to agree on fundamentals, and ignore non-essentials, over which we all could argue 'til dooms-day, and never reach a final conclusion.

NEW NATIONAL FOREST CREATED IN FLORIDA

President Coolidge has just signed a proclamation segregating the Ocala division of the Florida National Forest as the Ocala National Forest, it has been announced by the Forest Service of the United States Department of Agriculture.

The new Ocala National Forest will have a separate administrative organization. With the segregation of the Ocala division, the State of Florida now has two National Forests.

The creation of the Ocala National Forest as a separate unit will further the growing of timber on the sandy soils, the protection of the area against fire, and the improvement of the area for recreational purposes, together with administration of the game, in cooperation with the State Game Department, says the Forest Service.

The Ocala National Forest has a gross area of 252,000 acres, of which 158,622 are owned by the United States.

Water buckets in the dairy barn pay for themselves quickly, for the cows will produce more milk.

GENUINE PERUVIAN GUANO

Nature's Finest Fertilizer

Try as we may with chemical substitutes, nothing can excel the excellent material provided by nature—Genuine Peruvian Guano. To get the best crop—the finest fruit—profit by the age-old knowledge that this is Nature's Finest Fertilizer.

Deposited for centuries, by millions of birds, Guano is always available to the citrus fruit and truck growers of Florida through

NACO BRAND

These fertilizers contain the valuable Peruvian Guano in liberal quantities, consequently your crop and yield are bound to be better.

NITRAPO

Ammonia and Potash in a natural combination—double refined—pure—snow white in appearance — nothing like it for producing a good, solid, luxurious bloom and large-size fruit, with unexcelled carrying qualities.

NITRATE AGENCIES COMPANY

NACO BRAND

Peninsular Casualty Building Jacksonville Florida

WATER REQUIREMENTS OF FLORIDA CITRUS TREES

Continued from page 27

ture by keeping down the growth of weeds is not only merely a waste of time and money but expedites the oxidation, or burning up, of the humus in the soil.

Virtually all Florida citrus growers rely upon the rainfall to take care of the water requirements of their groves and congratulate themselves that they can get along without having to resort to irrigation as in California. In general this method suffices in most localities and, barring occasional losses of fruit and damage to trees from prolonged drought, most of the growers manage to maintain their groves sufficiently well to feel that irrigation under the present costs is not practicable in most cases. However, our rainfall is highly irregular, occurring in too great abundance at one season and too scantily at another. It can not be denied that our citrus trees are induced to make a good vegetative growth during the rainy season of the summer and fall months and to develop the fruit which they have set, and then, as the crop approaches maturity, at a critical period when the bearing trees actually require more water than at any other period of the year, they actually receive far less by virtue of the advent of the dry season during the winter and spring months.

Notwithstanding the general belief that irrigation is unnecessary or impractical from the standpoint of present costs, there is considerable evidence to show that a good irrigation system would be profitable investment in many cases. An examination of the weather records for a period of 25 years, made a few years ago by drainage engineers of the U. S. Department of Agriculture shows that there have been periods of decided moisture deficiency in Florida in about one year out of four and that serious droughts which have caused considerable loss to citrus growers have occurred at least four years out of 27. Since the harvesting of a good crop during a droughty year often pays the full cost of installing an irrigation system, it would appear that irrigation is at least a cheap insurance. There are probably no figures published for Florida to show the increase in tree growth and crop production to be accomplished by irrigation. A number of irrigated and non-irrigated pineapple orange trees at Tropic, on the extreme end of Merritts Island, have been kept under observation by the writer during the past few years. These trees were set out in June, 1921, on Gainesville sand closely underlaid by coquina rock, the holes being first blasted to remove the rock before planting. A number of these trees were planted along side of a double row of bananas which are irrigated by running water from a flowing artesian well down a ditch between the banana rows. Twenty-five representative irrigated trees averaged 10.8 centimeters in diameter at a point 1 foot above the ground and 13 feet in height while 13 unirrigated trees between one irrigated row and the scrub along the river averaged but 6.8 centimeters in diameter and 8.4 feet in height. It is apparent that the proximity of the scrub had exerted a considerable retarding effect upon these trees for 12 other unirrigated trees near the center of the grove averaged 8.1 centimeters in diameter and 10 feet in height. It will thus be seen that the irrigated trees averaged 33 per cent better in diameter and 25 per cent better in height than even the best of the unirrigated ones. The irrigated trees were larger in every way and characterized by a much greater vigor of growth and size of foliage than the unirrigated ones. During the winter of 1926-27 the irrigated trees averaged between two and three boxes while the unirrigated ones averaged less than a box of fruit per tree.

This is truly a striking example of the benefits to be derived from irrigation in a soil of a rather droughty nature. While the results of irrigation on other types of soil perhaps would not be commensurate with these, there is no question in the writer's mind but that irrigation would greatly increase not only the vigor, development and yield of citrus trees, but would cause the fruit to hang longer without drying up, greatly prolong the lives of the trees and eliminate the loss of trees from that chronic wilt termed "blight" and a number of other obscure troubles as well.

Even in the case of a large acreage of grove which is producing fairly profitable returns, it is believed that such returns would be very much greater if water for irrigation was available. Although irrigation in Florida is not necessary every year, a possible source of water supply to be drawn upon during dry years would be the most valuable form of insurance which the grower could obtain. There are large acreages of groves in Florida where good returns are obtained year after year without irrigation, yet even in the most favorable cases as the trees grow older,

QUALITY FERTILIZER

costs more, but the difference is, your bank balance will be larger when your crop is marketed.

For

Quality Results

Use

Orange Belt Brands

LYONS FERTILIZER CO ORANGE BELT BRANDS TAMPA FLORIDA

"Quality Fertilizers"

for

"Quality Fruit"

The Newark Company
Incorporated
CARLOT DISTRIBUTORS
COMMISSION MERCHANTS
FRUITS AND PRODUCE
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KNOW the latest FACTS right from Washington, the center of farm news. The National Farm News. Is an independent weekly newspaper edited for farmers and rural folks by men who know agriculture. Prints truthful "first hand" news and information not found in other newspapers. NOTHING ELSE LIKE IT. Special trial subscription offer 10 weeks for 10c

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THE NATIONAL FARM NEWS
215-217 G St. N. W. Dept. XX Washington, D. C.

filling the soil with roots, drawing more completely upon its moisture content, and demanding more and more water as the tops grow larger and the crops greater, the desirability of irrigation is likely to become more pronounced. It is not wise to wait until the trees show signs of drought, since citrus trese will not show lack of moisture until the deficit has been long continued. Experimental work on citrus wilt or blight, water injury and related troubles by the writer during the past four years has shown that the begining of wilting and curling of citrus tree foliage must be regarded as the critical point in the life of the older bearing trees.

It is believed that the desirability and the limiting factors of the different soil types on which Florida citrus groves are planted, and the correct method of soil management on the more important soil types to insure optimum moisture conditions for citrus trees, is an agronomical problem that could very profitably be given considerable attention and research. Truly the maintenance of optimum conditions of soil moisture in many of the groves established in Florida calls for as much exercise of thought and attention to keep the trees in a good state of vigor and crop production, and is of at least as much importance, as the control of insects and the diseases caused by fungous and bacterial organisms.

Agriculture pays indirectly about one and one half billion dollars in wages to urban workers.

Agriculture pays in taxes a fifth of the total cost of government in the United States.

It has been found that peanut meal may be used in the ratio of one part to three parts of corn without causing soft or oily pork.

A rabbit experiment station will be opened in California shortly. The purpose is to improve the rabbit raisin gindustry throughout the country.

EXPERIMENT STATION LIBRARY HAS MOVED

The library of the agricultural experiment station has been moved from the Station building into the new Horticultural building. While moving it was necessary to close for a number of days, but Mrs. Ida Keeling Cresap, librarian, announces that all material is now in order and the library open from 8 to 12 in the morning and from 1 until 5 in the afternoon.

The Brogdex System

The best method for reducing losses from blue mold and for retarding wilting and shrinkage

FLORIDA FRUIT NEED BORAX AND BROGDEX

It is admitted by all shippers that one of the greatest difficulties Florida has in meeting California Competition is in the fact that the dealer has too great a loss from decay and shrinkage when he sells Florida Fruit. The superior flavor and greater juice content are freely admitted. But this avails nothing if the dealer must throw away any great percentage of fruit.

DECAY AFTER ARRIVAL

He may receive the fruit sound but if they decay after he gets them, then he loses, and is dissatisfied. Next time he will either buy something else or endeavor to get his Florida oranges cheaper so that he has a greater margin to cover this decay. Or he will charge the consumer more to make up his losses and thereby reduce Consumption.

REFRIGERATION INCREASES DECAY AFTER ARRIVAL

Refrigeration and pre-cooling only pass along the decay to the dealer and consumer because, while pre-cooling and refrigeration will get the fruit to destination in sound condition, it is well known that these refrigerated fruit decay more rapidly after being exposed to the open air due to weakening of the fruit and due to the presence of moisture of condensation commonly called sweating.

BUILD THE REPUTATION OF YOUR BRAND

It will not take a dealer long to learn that certain brands will keep on his shelves and we will demand your brand if you use borax and Brogdex. The borax will reduce decay from blue mold and the Brogdex will retard wilting and shrinkage. They will stay fresh on his stands. Eventually he will insist on your brand. This is what has happened to the Mutual Orange Distributors in California who have used Brogdex for five years. You seldom see MOD fruit on the auction reports. It is practically sold F.O.B.

BORAX AND BROGDEX

The Brogdex System comprised treatment with Borax to reduce decay and with Brogdex to retard wilting and shrinkage. A satisfied purchaser is the best advertisement. It is just as true of fruit as it is of automobiles. If you use this system your fruit will give satisfaction. Without it there will be complaints regarding decay, perhaps not to you but to the jobber who distributes the fruit to the dealer.

Florida Brogdex Distributors, Inc.

13th and Cumberland Streets

Tampa, Fla.

CITRUS BY-PRODUCTS

Continued from page 5

use is being increased so rapidly that at the present rate we shall have to face the fact of a scarcity of fruit of any grade to meet this demand.

Orange juice is being distributed daily similarly to milk delivery. It is being supplied to schools for the children's mid-morning lunches and to hospitals for patients daily.

For distribution to distant places where preservation for a considerable period of time is necessary it is handled in other forms. These forms are defined by the Food and Drugs Department of the United States Department of Agriculture.

SWEETENED JUICE in juice to which has been added less than 50% of cane sugar.

FRUIT SYRUP must contain at least 50% of cane sugar and at least 33 1-3% of orange juice.

FRUIT JUICE CONCENTRATE is fruit juice from which moisture has been removed by evaporation in vacuum or at atmospheric pressure or by freezing.

Some varieties of oranges are better for juice than others. Some are not suitable alone but require blending with lemon or lime juice to produce the required acidity.

LEMON, grapefruit and lime juice can be used similarly to orange juice but have their pronounced characteristic flavor usually due to greater acidity which permit their being used alone.

PEEL is an important consideration in juice production and its disposal has been a serious problem with most citrus juice producers.

ESSENTIAL OIL is an important product of the peel. There are numerous uses to which citrus oils can be put. The better qualities are used in the beverage, extract and perfumery industry; while the poorer grades can be used in the soap industry.

CITRUS PULP. After the juice and oil have been extracted there remains the pulp. By recent inestigations by the College of Agriculture of the University of California to determine the value of orange pulp as stock feed it has been shown that it compares well with beet pulp.

PECTIN. The white portion of the citrus peel is rich in pectin, a product, the composition of which is not definitely known, but which is used extensively in the preserving industry. New uses are being discovered for this product continually and the prospects are that it will be increased very extensively in the future. All citrus peels contain pectin but lemon is the only one which has been used to produce it commercial-

"The Best Oil Emulsion I Have Ever Used in the Fifteen Years I Have Been Growing Fruit in Florida"

The above comment by one of Florida's most successful growers of Citrus Fruit was made recently after using some Fifty barrels **NEW PROCESS STANDARD SPRAY FORMULA** on his groves.

A similar experience awaits you and a trial will convince the most skeptical.

Liberal sample and prices on request.

J. Schnarr & Company

Florida's Standard, Oldest Line of Sprays
Schnarrs Standard Dust Mixtures

Orlando, Florida

Winter Haven, Florida

ly.

CITRIC ACID. Citric acid is found in the juice of all citrus as well as other fruits, but the juice of the lemon is the most abundant source. Since an organism has been discovered which produces citric acid from molasses, a waste product in the manufacture of sugar, it is doubtful whether lemon juice will continue to be the most economical source of supply.

There are other products such as glaced or candied whole fruit or peel, confections and other specialties which can be made from citrus, thus turning them into products which will bring larger returns than could be obtained by marketing the fresh fruit.

Shall we continue to allow our surplus fruit to rot on the ground or find its way to the market to compete with packed fruit or shall we convert it into by-products which will give us a profit and at the same time protect our fresh fruit market against such losses as have been experienced in the past?

UNITED STATES CIVIL SERVICE EXAMINATION

The United States Civil Service Commission announces the following open competitive examination:

Junior Marketing Specialist
(Fruits, Vegetables, and Miscellaneous products)

Applications for junior marketing specialist must be on file with the Civil Service Commission at Washington, D. C., not later than December 3. The date for assembling of competitors will be stated on their admission cards, and will be about ten days after the close of receipt of applications.

The examination is to fill vacancies in the Bureau of Agricultural Economics, Department of Agriculture, for duty in Washington, D. C., or in the field, and vacancies in position requiring similar qualifications.

The entrance salary is $1,860 a year. A probationary period of six months is required; advancement after that depends upon individual efficiency, increased usefulness, and the occurrence of vacancies in higher positions.

The preceise duties of appointees will depend somewhat upon their personal qualifications and upon the needs of the service at the time of appointment. In general, they will be principally in connection with the market news service of the Bureau of Agricultural Economics, in the collection and compilation of information concerning shipments, receipts, and prices in producing sections and in the larger markets, in the preparation and distribution of market reports, and in investigations of methods and costs of marketing.

Competitors will be rated on practical questions on the marketing of fruits, vegetables, and miscellaneous products; and a thesis to be handed to the examiner on the day of the examination.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the United States civil service board of examiners at the post office or customhouse in any city.

INTERESTING DATA ON FLORIDA-GROWN FOODS

Gainesville-Fla.—There are many Florida-grown foods in season now which are especially healthful, says Dr. Ouida Davis Abbott, of the home economics division of the Florida Experiment Station. Most of these foods are regarded as somewhat commonplace, but they provide the salts which are essential to health, and help to regulate the body processes.

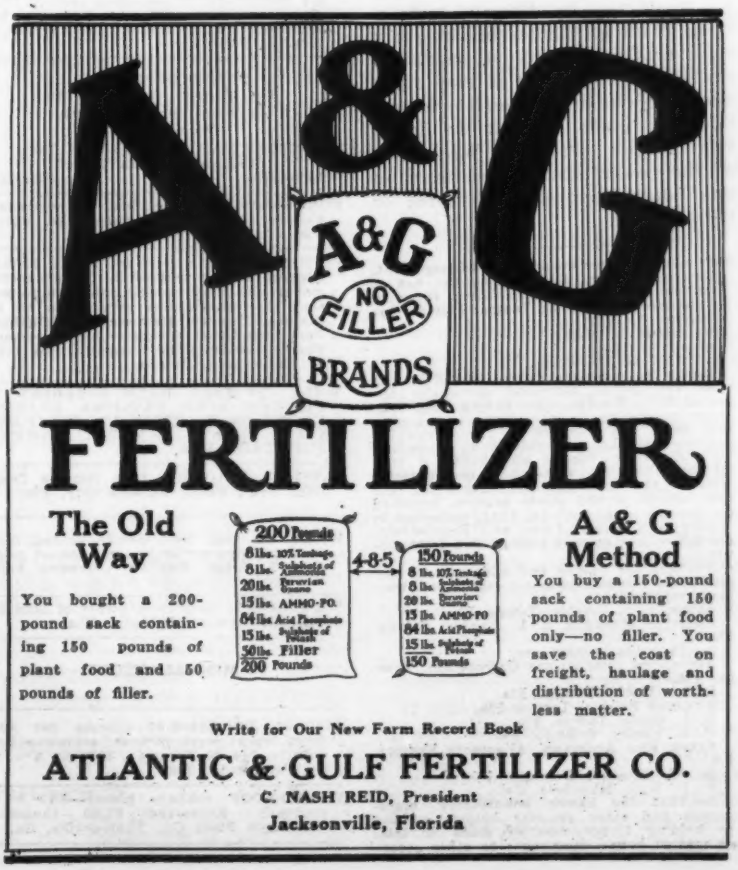
Oranges and grapefruit are low in protein, but high in carbohydrates and mineral salts. They contain vitamines which prevent scurvy, and they also help regulate normal body functions. Cabbage and rutabags are likewise low in protein but high in carbohydrates and salts. Turnips and turnip greens are other foods which should be on Florida tables at this time.

All of the vegetables contain vitamines A, B and C. They are also particularly rich in minerals, especially in iron, calcium, and phosphorus.

Pecans are very high in protein and fat. The proteins are of good quality and complete. Pecans may be used as a substitute for meat or fats but not for eggs or dairy products.

While it required 473 pounds of grain to produce 100 pounds gain in pork when feeding corn, fish meal and shorts, it required only 354 pounds of grain when skimmilk was used as a supplement for corn. When dried buttermilk was used it required only 364 pounds of grain to get 100 pounds gain.

"Where y' going?"
"To the engraver's."
"Who's being buried?" — Texas Ranger.


A&G
A&G
NO FILLER
BRANDS
FERTILIZER
The Old Way
You bought a 200-pound sack containing 150 pounds of plant food and 50 pounds of filler.
200 Pounds
8 lbs. 10% Tankage
8 lbs. Sulphate of Ammonia
20 lbs. Peruvian Guano
15 lbs. AMMO-PO.
84 lbs Acid Phosphate
15 lbs. Sulphate of Potash
50 lbs. Filler
200 Pounds
4-8-5
150 Pounds
8 lbs. 10% Tankage
8 lbs. Ammonia
20 lbs. Peruvian Guano
15 lbs. AMMO-PO
84 lbs Acid Phosphate
15 lbs. Sulphate of Potash
150 Pounds
A & G Method
You buy a 150-pound sack containing 150 pounds of plant food only—no filler. You save the cost on freight, haulage and distribution of worthless matter.
Write for Our New Farm Record Book
ATLANTIC & GULF FERTILIZER CO.
C. NASH REID, President
Jacksonville, Florida

DUSTING OF CITRUS TREES

Continued from page 10

more successful adhesive or method of application is discovered it is possible we may have better results to report.

Another type of dusting which has of necessity become widespread is that of dusting for aphis with nicotine dust. This has been successful where used when practically no air currents are moving but unfortunately this favorable time occurs so very rarely that it becomes very difficult to effect thorough control. As before stated we meet with best success by adding Blackleaf 40 at the rate of quart to 200 gallons of water, in our April lime-sulphur spray. By doing this we can reserve our duster for the more heavily infested areas.

Being in a particularly favored section so far as frost danger is concerned we prefer to combat the aphis by forcing our spring growth as early as possible. By so doing we find we are often able to beat the aphis. However, we would be quite uneasy if we did not know we could start out with a duster at a quiet time, and in a measure, subdue aphis in the worst infested areas. Having depended, for four years upon dusters for producing bright fruit, and for subduing the aphis, we confess we would feel handicapped without them. With rust mites breaking out all over the property at once, and multiplying so rapidly as they do, it would be virtually impossible to produce the grade of fruit we do by relying upon spray rigs. We consider the power duster a necessity on any bearing grove of 40 acres or more in size.

Statement of the Ownership, Management, Circulation, Etc., Required by the Act of August 24, 1912, of The Citrus Industry Published monthly at Tampa, Florida, for October 1, 1927.
November 1, 1927.

State of Florida,
County of Hillsborough..

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared S. L. Frisbie, who, having been duly sworn according to law, deposes and says that he is the manager of The Citrus Industry, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1—That the names and addresses of the publisher, editor, managing editor and business manager are:

Editor, S. L. Frisbie, Tampa, Fla.
Business Manager, S. L. Frisbie, Tampa, Fla.

2—That the owners are:

Associated Publications Corporation, Tampa, Fla.
S. L. Frisbie, Tampa, Fla.
S. Lloyd Frisbie, Tampa, Fla.
B. L. Gable, Tampa, Fla.
F. L. Skelly, Orlando, Fla.
Frank Kay Anderson, Altamonte Springs, Fla.
B. W. Skinner, Dunedin, Fla.
F. P. Wall, Mansfield, Ohio.

3—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities, are:

Mergenthaler Linotype Co., Brooklyn, N. Y.
Bankers Mortgage Co., Orlando, Fla.

S. L. FRISBIE, Editor.

Sworn to and subscribed before me this 5th day of October, 1927.

W. D. STONE,
Notary Public.

During the past year fires on farms and in rural communities took a toll of approximately 3,500 lives and damaged or destroyed property to a value estimated at $150,000.000.

CLASSIFIED Advertisments

The rate for advertisements of this nature is only five cents per word for each insertion. You may count the number of words you have, multiply it by five, and you will have the cost of the advertisement for one insertion Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we cannot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.

REAL ESTATE

WILL EXCHANGE West Texas cattle ranch for unimproved or improved land in Florida. What have you? Give price and full particulars. T. E. Bartlett, 3410 McKinley Ave., El Paso, Texas.

"BOOK OF TRUTH"
For planters of new groves
Is yours for the asking,
Write Today.
OCKLAWAHA NURSERIES INC.
"Pedigreed Citrus Trees"
Lake Jem, Florida

FOR SALE—Pineapple land in winterless Florida. $15 an acre. Almont Ake. Venus, Fla.

FIVE ACRES and a town lot, all for $700.00 Biggest bargain in Florida. Certain money maker. We want reliable salesmen to present this meritorious proposition to investors. Sumter Gardens and Bushnell Park lots. Every purchaser highly pleased. Florida Garden Land Company, Box 1759, St. Petersburg, Florida.

WANT TO SELL HALF INTEREST IN FIFTEEN ACRE SATSUMA BEARING GROVE ON HIGHWAY NEAR PANAMA CITY. ROBT. LAMBERT, OWNER. FOUNTAIN, FLA.

SATSUMA BUDWOOD from Bearing Trees. Hills Fruit Farm, Panama City, Fla.

WANT TO hear from owner having farm for sale; give particulars and lowest price. John J. Black, Box 93, Chippewa Falls, Wisconsin.

WANTED—To hear from owner of land for sale. O. Hawley, Baldwin, Wis.

MISCELLANEOUS

$1950.00 TO $3500.00 income per acre from limes; want partner. exclusive lime culture. Jas. N. Foreman, 4028 2d Ave. S., St. Petersburg, Fla.

FROSTPROOF cabbage plants—500 $1.00 postpaid. Expressed $1.00 thousand. Wholesale Plant Co., Thomasville, Ga.

FOR SALE—Dairy and stable manure, car lots. Link & Bagley, Box 464, Tampa, Fla.

WHITE WYANDOTT Cockrels, regal strain—the best in the country, direct from Martin pens. Utility and show birds $5.00 each; also eggs for hatching $5.00 per 15. W. A. King, Gen. Del., St. Petersburg, Fla.

FARM—GROVE—HOME

22 ACRE large bearing grove; modern two-story, 8 room house, completely furnished on third largest lake in state in thriving town; good roads, church, schools; complete line farm implements and tools. P. F. Cloonan, Yalaha, Lake County, Fla.

HIGH BLOOD PRESSURE easily, inexpensively overcome, without drugs. Send address. Dr. J. B. Stokes, Mohawk, Fla.

FOR SALE—200 pure bred white Leghorn hens $1.25 each, any quantity. Cockerels $2 each. Fain's Hatchery, Edison, Ga.

WANTED
COMPLETE LINE OF CITRUS GROWERS' SUPPLIES

A well known reputable firm of national scope, marketing certain materials required by citrus growers, is extending its line of merchandise to cover complete requirements of its customers.

If you have something excellent to merchandise—fertilizer, orchard heaters, pest control material or equipment, or any similar product for wide distribution—I can tell you whom you should see.

Address: J. T. Pierson, 503 South Union Drive, Los Angeles, Calif.

BEGGARWEED SEED

Very desirable for planting in groves and cover crops. We only have a limited quantity left. Until our stock is sold out we can supply at $43.00 per 100 lbs. or in smaller lots at 45c per lb. Quotation subject to immediate acceptance or being unsold on receipt of order. Write for our Fall seed price list.

E. A. MARTIN SEED COMPANY
202 EAST BAY STREET
JACKSONVILLE, FLA.

PUREBRED PULLETS FOR SALE—White Leghorns and Anconas ready to ship. Barred Rocks and R. I. Reds shortly. Several hundred yearling White Leghorn hens now laying 70%. Write or wire for prices. C. A. Norman, Dr. 1440, Knoxville, Tenn.

LAREDO SOY BEANS, considered free from nematode, excellent for hay and soil improvement. Write the Baldwin County Seed Growers Association, Loxley, Alabama, for prices.

MILLION Porto Rico Potato Plants, $2.50 1000. W. W. Williams, Quitman, Ga.

FARMER AGENTS: Make $25.00 weekly selling Comet Sprayers. Profitable winter employment. You take orders. We deliver and collect. Commissions weekly. Established 35 years. Particulars free. Rusler Co., Box C-18, Johnstown, Ohio.

EARLY BEARING Papershell Pecan trees budded or grafted and guaranteed. Great shortage this year. Write for catalog today. Bass Pecan Company. Lumberton, Miss.

FOR SALE—All varieties bananas and citrus trees. D. A. Nigels, Palm Harbor, Fla.

STRAWBERRY PLANTS. Send $2.50 for 500 Missionary or Klondyke. $4.50 per 1,000. Ready now. John Lightfoot, East Chattanooga, Tenn. 10-12t

RUNNER peanuts—Spanish peanuts Early speckled - Osceola - White Chinese and Bunch Velvet Beans. All varieties peas and Soybeans. Large or small lots. H. M. Franklin, Tennille, Georgia.

AVOCADOS - SEED — Grafted. Reliable bearers only. John B.Beach, West Palm Beach, Florida.

WANT FARM priced right, with or without crops. Describe. Emory Gross, North Topeka, Kansas.

PORTO RICO Potato Vines $2.00 Thousand. Smith Bros., Nocatee, Fla.

PLANT AVOCADOS in Redland Section, Dade County, where they thrive best. Best paying crop in United States. Send for prospectus. Brooks Properties, Realty Board Bldg., Miami.